

*Diplommatina (Gastroptychia) electa*, sp. n.

Shell sinistral, oblong-conic, greyish brown, moderately solid, ornamented by fine and close-set oblique striæ; whorls 8, distinctly convex, regularly increasing; aperture subovate, orange within; peristome double, the inner part exerted forward and the outer expanded, orange-colour; columella tortuous, expanded at point of insertion, bearing a distinct plait on the lower part, which is continued within the aperture; two interior plaits or callosities are seen from the exterior, more plainly if the shell be wetted, the first appears as a perpendicular orange-coloured line commencing just above the point of insertion of columella and directed upwards, the other runs near to and parallel with the suture, and is situated just to the right of the aperture.

Maj. diam.  $3\frac{1}{2}$ ; alt.  $6\frac{1}{2}$  mm.

Hab. N. Borneo (*Waterstradt*).

This distinct species can easily be separated from *D. adversus*, Ad., by its more regular form, stronger sculpture, and more numerous whorls.

X.—On Chelonethi, chiefly from the Australian Region, in the Collection of the British Museum, with Observations on the "Coxal Sac" and on some Cases of Abnormal Segmentation. By C. J. WITH, Copenhagen.

[Plates VI.-X.]

THE observations included in this paper were all made on material belonging to the British Museum (Natural History). For the liberality with which the collections of Chelonethi were handed over to me I tender to the Director, Professor E. Ray Lankester, my best thanks. I am also grateful to Dr. W. T. Calman, because he assisted me with his extensive knowledge of literature, as well as to several members of the entomological staff, especially Col. Bingham, by whose kindness it became possible for me to investigate some specimens of Hymenoptera which were remarkable on account of their abnormal segmentation.

In the following pages I have first given a revision of the Australian species of *Chelifer*, because I had occasion to examine a good many of the described species, and among them several typical specimens. In addition to these, I have

described or redescribed several species from other parts of the world, which seemed to me of special interest. Owing to the fact that I have taken characters from several organs—for instance, the legs and antennæ—hitherto more or less ignored by students of this group, it has been necessary to give rather long descriptions. In this paper I have no occasion to discuss the generic value of several of these characters, but refer to another paper which I hope to publish shortly. The same is the case with my studies on the coxal sac of *Ch. socotrensis*, sp. n., of which I have given a short description without comparison with the corresponding organ in other nearly related forms. With regard to the ocdysis, about which scarcely anything is found in the literature, I refer to the description of *Ch. sculpturatus*, Lewis (p. 122).

Some cases of abnormal segmentation in *Ch. sculpturatus*, Lewis, and *Ch. javanus*, Thor., described in the third part of this paper, and compared with similar cases in other Arthropods and Annelids, are, perhaps, of more general interest.

#### I.—SYSTEMATIC PART.

The following synopsis of the species of the genus *Chelifer* from the Australian Region, as well as of those from other parts of the world described in this paper, has been difficult to get into proper shape on account of the very incomplete descriptions of many species; but, nevertheless, I hope that it will be fairly easy to identify most of the species by its help:—

- a. Femora and tibiæ of the palps beset with large subconical tubercles. . . . . *sculpturatus*, Lewis.
- b. Femora and tibiæ of the palps without any tubercles.
  - a<sup>1</sup>. Femora of the palps at least three times longer than broad. Fingers shorter than hand.
  - a<sup>2</sup>. Trochanter of the palps distinctly broader than the femur.
  - a<sup>3</sup>. Eyes distinct. Abdominal and tarsal "tactile" hairs present.
    - a<sup>4</sup>. Hairs partly clavate; skin shagreened . . . . . *laysanensis*, Sim.\*
    - b<sup>1</sup>. Hairs pointed; skin almost smooth; tarsus iv. with median "tactile" hair and only 1·5 times longer than femur iv. is high. Claws with

\* *Ch. laysanensis*, Sim., and *Ch. megasoma*, Dad., each occur twice in this synoptic key, because the characters used under a<sup>1</sup>-b<sup>1</sup> and a<sup>2</sup>-b<sup>2</sup> are not mentioned in the original descriptions.

- anterior tooth; fingers without accessory teeth ..... *bifissus*, Sim.
- b*<sup>3</sup>. Eyes or ocular spots not present. Abdominal and tarsal "tactile" hairs wanting; tarsus iv. at least twice longer than the femur is high; claws without teeth; fingers with accessory teeth.
- a*<sup>5</sup>. Femora of the palps without stalk, gradually widened out towards the extremity, four times longer than broad; inner margin of hand only slightly convex ..... *hawaiiensis*, Sim.
- b*<sup>5</sup>. Femora of the palps without stalk, not gradually but rather abruptly widened out and broadest in the middle, less than four times longer than broad; inner margin of hand distinctly convex. .... *pacificus*, sp. n.
- b*<sup>2</sup>. Trochanter of the palps not broader than femur. Femora stalked and not gradually widened out distally.
- a*<sup>6</sup>. Eyes distinct; hairs of tergites clavate, not pointed; two transverse grooves; abdominal "tactile" hairs present.
- a*<sup>7</sup>. Skin shagreened; hand a little longer than fingers ..... *laysanensis*, Sim.\*
- b*<sup>7</sup>. Skin with low granules; hand much longer than fingers; tarsus iv. with terminal tactile hair and twice longer than the femur is high; claws with anterior tooth ..... *socotrensis*, sp. n.
- b*<sup>6</sup>. Eyes wanting; hairs pointed; no transverse grooves (?); hand much longer than fingers ..... *megasoma*, Daday.\*
- b*<sup>1</sup>. Femora of the palps not three times longer than broad; eyes wanting.
- a*<sup>4</sup>. Hairs of palps not always pointed, partly clavate or obtuse.
- a*<sup>9</sup>. Hairs of palps partly clavate. Femur not longer than tibia.
- a*<sup>10</sup>. Hand distinctly (1.5) longer than fingers; inner margin of hand convex, not semicircular ..... *aequatorialis*, Daday.
- b*<sup>10</sup>. Hand not or only slightly (1.2) longer than fingers.
- a*<sup>11</sup>. Finger longer than the hand is high; inner margin of hand not semicircular ..... *scorpioides*, Herm. (?).
- b*<sup>11</sup>. Finger as long as the hand is high; inner margin of hand semicircular; tarsus iv. without tactile hair and 2.5 longer than the femur is high; fingers with accessory teeth; lower tubercle of the trochanter rounded, not subconical ..... *australiensis*, sp. n.

- b*<sup>5</sup>. Hairs of palps not clavate, but obtuse; femur distinctly longer than tibia; fingers a little shorter than hand and longer than the hand is high; tarsus iv. with median "tactile" hair; fingers with accessory teeth; lower tubercle of trochanter subconical . . . . . *brevispinosus*, Keys.
- b*<sup>6</sup>. Hairs of palps pointed.
- a*<sup>12</sup>. Tubercles of the trochanter exceedingly long, at least one subconical; ocular spots; no transverse grooves; tarsus iv. with basal "tactile" hair and only 1.3 longer than the femur is high . . . . . *equester*, sp. n.
- b*<sup>12</sup>. Tubercles of the trochanter moderate or wanting.
- a*<sup>13</sup>. At least one transverse groove.
- a*<sup>14</sup>. Fingers much shorter than hand, not longer than the hand is high; ocular spots . . . . . *pallipes*, White.
- b*<sup>14</sup>. Fingers almost as long as hand.
- a*<sup>15</sup>. Ocular spots wanting; fingers scarcely shorter than hand, with accessory teeth; tarsus iv. with median "tactile" hair . . . . . *pygmæus*, Keys.
- b*<sup>15</sup>. Ocular spots present; fingers distinctly shorter than hand . . . . . *ramosus*, Keys.
- b*<sup>13</sup>. No transverse grooves; fingers distinctly shorter than hand.
- a*<sup>16</sup>. Femora more than twice longer than broad; no ocular spots . . . . . *measoma*, Daday.\*
- b*<sup>16</sup>. Femora of the palps only twice longer than broad.
- a*<sup>17</sup>. Hairs of the tergites within a distinct white spot . . . . . *punctatus*, Keys.
- b*<sup>17</sup>. Hairs not situated in distinct white spots; hand higher than broad, distinctly longer than fingers . . . . . *brevidigitatus*, Keys.

*Geographical Distribution.*

The following species of *Pseudoscorpiones* are known from the Australian Region:—

From the Australian continent: *Chelifer australiensis*, sp. n.; *Ch. brevidigitatus*, Keys.; *Ch. brevispinosus*, Keys.; *Ch. punctatus*, Keys.; *Ch. pygmæus*, Keys.; *Ch. ramosus*, Keys.; *Olpium longiventer*, Keys.

From New Guinea: *Chelifer æquatorialis*, Dad.; *Ch. megasoma*, Dad.; *Ch. scorpioides*, Herm.; *Chthonius Wlassicsi*, Dad.; *Ideobisium bipectinatum*, Dad.

From New Zealand: *Chelifer pallipes*, White.

From New Caledonia: *Obisium antipodum*, Sim.

From Funafuti: *Garypus longidigitatus*, Rainbow; *Obisium antipodum*, Sim. (?).

From Sandwich Islands: *Ch. bifissus*, Sim. (?); *Ch. hawaiiensis*, Sim.; *Ch. pacificus*, sp. n.; *Garypus personatus*, Sim.

From Laysan: *Ch. laysanensis*, Sim.

I will prove later on (p. 100) that it is doubtful if the specimens of *Ch. bifissus*, Sim., from Sumatra and Hawaii really are the same species. The occurrence of *Ch. scorpioides*, Herm. (Daday, 4, p. 477), in New Guinea and *Obisium antipodum*, Sim. (Rainbow, 5, p. 108), at Funafuti cannot be accepted without further investigation. *Olpium (Ampli-olpium) longiventer*, Keys., has been found on Hawaii and Funafuti according to Simon (9, p. 519) and Pocock (6, p. 321). I have examined the original specimens determined by these two naturalists, and a detailed investigation has convinced me that they are different from each other as well as from *Olpium longiventer*, Keys., and are most naturally referred to the genus *Garypinus*, Daday.

#### *Description of Species.*

Under the heading "Measurements" in the following descriptions the first figure in each case gives the greatest length of the organ referred to. The figures within brackets give, in the case of the body, antennæ, and palps, the breadth, or, when there are two figures, the greatest and least breadth. In the case of the legs the figures within brackets refer to the height of the joints.

#### *Chelifer bifissus*, Sim. (Pl. VI. figs 1 a-f.)

1899. E. Simon, (8) p. 121.

1900. E. Simon, (9) p. 517.

*Cephalothorax*.—The *eyes* are indistinct. The cephalothorax, which is slightly longer than broad, possesses two rather indistinct transverse *grooves*, which are almost straight. The second thoracic tergite has an indistinct longitudinal line. The smooth and brilliant skin bears short and dentated hairs.

*Abdomen*.—The abdomen, which is longer than broad, has the tergites of almost equal length as well as breadth, with the exception of the first three, which are shorter. The second to the tenth sclerites are divided by an indistinct longitudinal line; the sclerites are almost smooth and with a hindmost marginal row of rather long hairs, with some distal teeth; the median segments possess at least one lateral hair

in front of the row on each side; the eleventh tergite bears one pair of "tactile" hairs in addition to the usual, which are long and placed without order. The lateral membranes are provided with densely placed longitudinal wrinkles or ridges. The fourth to the eleventh sternites are scarcely different from the corresponding tergites.

*Antennæ* (fig. 1 a).—The *flagellum* seems to consist of three almost simple hairs. The immovable finger bears on the inner dorsal margin some few minute teeth just behind the tip and farther backwards three larger. The *galea* (fig. 1 a), which is scarcely longer than the distal curved hair, has at least six distal teeth. The *serrula* is composed of about 25 rather high teeth, of which the basal one has the usual wide flap.

*Maxillæ*.—The maxillæ, especially their distal portion, which is surrounded by a broad, exteriorly dentated lamina, are provided with many hairs.

*Palps* (fig. 1 b).—The palps are smooth, with the exception of the exterior surface of the trochanter. The hairs are rather scarce, slender, broken, and distally provided with a tooth; they appear rather long, especially on the inner side. The fingers possess several tactile hairs. The *trochanter*, which has a rather long stalk, is distinctly longer than broad; its inner outline is evenly convex, its outer more abruptly so; a slightly marked upper protuberance is present. The *femur*, which has a short rather distinct stalk, is not so broad as the trochanter; the inner surface is in the proximal half slightly convex and in the distal slightly concave; the outer side is evenly convex. The *tibia*, which has a moderately short but distinct stalk, is shorter than the femur and a little broader; the inner surface is beyond the notch, which marks off the stalk, moderately convex; the stalk has exteriorly a basal prominence, which forms part of the articulation, and a distal low elevation separated from the former by a little notch; the joint proper is at first almost straight and then distinctly convex. The *hand*, which is almost as long as but broader than the tibia, is evenly convex both inwards and outwards; it is broader than high and distinctly longer than the fingers, which scarcely gape when closed.

*Coxæ*.—The third and the second pairs of coxæ are of almost equal breadth and widened out distally; the fourth pair, which is almost as broad basally as distally, is as broad as the third is at the end; the hinder margin is almost straight and forms an obtuse rounded angle with the inner.

*Legs* (figs. 1 c-f).—The scarce hairs of the legs are almost all provided with one or two minute teeth distally, and

broken; the hairs of the ventral side are the longer; near the tip of the tarsus some simple hairs are found. The dorsal "tactile" hair of the fourth tarsi is nearer to the base than to the tip and scarcely shorter than the tarsus; dorsally near to the base of the claws there is a pair of curious hairs. The posterior hair of tarsus iv. (fig. 1*f*) is rather slender, and becomes suddenly thinner near the tip, where it is bifurcate; the lower branch is very slender, much the longest, and almost straight, while the upper is very short, most similar to a tooth (fig. 1*f*). The anterior hair is distinctly curved, rather suddenly pointed, and with a little dorsal tooth near the tip; the shape of this hair is consequently very similar to that found in *Chelifer javanus*, Thor., &c. The posterior hair of the first pair of tarsi is comparatively shorter than that of the fourth pair, and has the lower branch slightly curved downwards (fig. 1*e*) as in *Ch. socotrensis*. The anterior hair is moderately long and thick, and its distal enlarged portion bears at least three teeth. The claws possess a well-developed anterior tooth near the tip. The arcola is shorter than the claws. The legs are short and rather stout; the trochantin of the first pair is very long. The tibia, which is moderately enlarged distally, is distinctly longer than the slightly pointed tarsus; the tarsus of the fourth pairs is comparatively much longer than the tarsus of the first.

*Colour*.—The palps are reddish brown; the cephalothorax is brilliant dark brown; the abdominal tergites are lighter brown and not brilliant. The coxæ and the maxillæ are reddish brown, lighter than the palps; the legs are yellowish brown.

*Measurements*.—Cephalothorax 0.560 (0.520); abdomen 1.300 (0.896) mm.

Palps: trochanter 0.308 (0.175); femur 0.550 (0.153); tibiæ 0.513 (0.189); hand 0.495 (0.257), height 0.225; fingers 0.380 mm.

Leg i.: femur 0.220 (0.120), trochantin 0.180; tibia 0.216 (0.081); tarsus 0.171 (0.053) mm.

Leg iv.: femur 0.405 (0.153), trochantin 0.171; tibia 0.315 (0.099); tarsus 0.216 (0.063) mm.

*Material, Remarks*.—I have examined Simon's specimen from Olaa Hawaii. Mons. Simon writes:—"Le *Ch. bifissus* de Hawaii ne diffère en rien de celui de Sumatra." I have not had occasion to examine specimens from India, but, to judge from the description (8, p. 121), there are some differences not quite without importance. I hope my description will make it possible for those who have specimens from the latter region to settle the question whether the Pacific and

Indian specimens belong to the same species. The characters in which the Hawaii specimen differs seem to be the following:—The femur has a distinct stalk and is not so broad as the tibia; the hand is distinctly broader than the tibia and longer than the fingers; the galea is not simple.

*Chelifer australiensis*, sp. n. (Pl. VI. figs. 2 a-g.)

*Cephalothorax*.—The *eyes* or ocular spots are missing. The cephalothorax, which is as broad behind as it is long, becomes gradually narrow in front; the sides are straight or almost so, passing gradually into the front margin through a moderate convexity. Two dark rather distinct *grooves* or lines are present; the first is nearly straight, while the second is moderately curved forwards in the middle; both grooves are, as usual, widened out laterally, showing that they represent the interarticular membrane between the convex anterior and posterior margins of the adjacent somites. The *skin* is minutely granular and provided with moderately short clavate hairs, of which the most prominent are set in transverse rows along the front margin of the head and the hindmost margins of the two tergites.

*Abdomen*.—The abdomen, which is almost as broad as long, is broadest just behind the middle. The sclerites of the tergites are of almost equal breadth, but the first three are, as usual, the shortest; the hinder margin of each sclerite covers the front margin of the following. There seem to be traces of lateral projections or keels on the tergites. The sclerites, with the exception of the eleventh, are divided by a longitudinal line. Their granulation is better marked than that of the cephalothorax. About thirty rather short but distinctly clavate hairs are placed along the hinder margin of the sclerites; besides, a single hair is placed laterally in front of the row on all the tergites with the exception of the first three; the last ones have, in addition, a median pair in front of the row. The hairs of the eleventh tergite are more irregularly arranged, and there seem to be no long, slender, pointed "tactile" hairs.

The lateral membranes possess densely placed undulated ridges. The fourth to the tenth sternites are, like the tergites, longitudinally divided; there is an increase in their length as well as in breadth from before backwards; the fourth is only half as broad and two thirds as long as the tenth sternite. The sclerites bear hairs along their hinder margins, which are less distinctly clavate, especially those of the front sternites, where they are almost simple.



The sexual area consists of a semilunar hairy plate behind the genital opening; in front and between the coxæ there is a long and broad plate, which has the hindmost margin slightly concave in the middle and is provided with many hairs; laterally this plate is nearly connected with the corners of the posterior plate. In the area between the two plates several minute internal organs are seen through the integument (fig. 2 a).

*Antennæ* (figs. 2 b-c).—The *flagellum* (fig. 2 b) is composed of four hairs, of which the foremost is the longest and the hindmost the shortest; they are all, especially the first and fourth, provided with a few teeth along the front margin. The four hairs are so closely connected at the base that probably they can only be moved together. The immovable finger bears about five teeth on the inner dorsal margin. A well-developed *lamina exterior* is present, as well as a *lamina interior*; the latter has a strongly folded plate-shaped portion which, when seen from below, covers the proximal dentated lobes. These lobes are placed obliquely to the longitudinal axis of the finger and directed forwards and downwards, each covering the hinder or basal margin of the following when seen in ventral view. The terminal spine, which seems to be placed on a slightly higher level than the lobes, has four teeth. The *galea* (fig. 2 c) is moderately long and slender and distally provided with five teeth of different sizes. The *serrula exterior* consists of about twenty-nine teeth, of which the median ones are the shortest and almost squarely truncate; the basal tooth is distinctly longer than the following, but only slightly enlarged distally; the last one is, again, a little more pointed and longer than the preceding.

*Maxilla* (fig. 2 a).—The maxillæ are granular and densely covered with rather long, slender, and distally dentated hairs. The *lamina maxillaris* is rather short.

*Palps* (figs. 2 d-e).—The palps are indistinctly granular and everywhere beset with rather long, more or less clavate hairs; those of the fingers are pointed and amongst them are some tactile hairs. The *trochanter*, which is longer than broad, has a distinct stalk; the inner side has an almost semicircular outline from the stalk to near the tip; the outer side bears two blunt prominences, of which the ventral and proximal is the longer, while the more dorsal is less marked. The *femur*, which is twice as long as broad and broader than the trochanter, has a distinct stalk; this is most marked when seen from the side, because the upper surface is much more distinctly and suddenly raised than the exterior; the

inner side beyond the stalk is first moderately convex, and thereafter concave, while the outer side is regularly convex from the base to the tip. The *tibia* is as long as and distinctly broader than the femur, with a rather long and well-marked stalk; the inner side has first a deep notch to mark off the stalk, but is thereafter distinctly convex to near the tip, where a gentle concavity is found. The outer side, beyond the low basal protuberance which forms part of the articulation and the following low concavity of the stalk, is convex to near the tip, where a short low concavity is found. The *hand* (figs. 2 *d-e*), which is a little shorter than the tibia, but 1.4 times broader, is higher than broad, almost as high as long, and as high as the fingers are long. The curvature of the upper and inner surfaces, which are almost semicircular, is more marked than that of the lower and outer. The fingers, which gape slightly when closed, are provided with the usual row of triangular teeth; the immovable finger bears also on the inner side four accessory teeth behind the distinctly hooked tip, and at some distance from these four others near the middle; on the outer side there are about nine of these teeth distally. The movable finger also bears a few on the inner and outer side near the tip.

*Coxæ* (fig. 2 *a*).—The first pair of coxæ are almost trapezoid; the two following pairs are nearly triangular, as the inner margin is very short; the fourth pair have a similar shape, but the inner side is broader and the intero-posterior angle is obtuse and rounded.

*Legs* (figs. 2 *f-g*).—The legs are moderately long and slender; the hairs, especially the dorsal, are more or less enlarged distally, with a number of minute spines in all directions; this kind of hair is called clavate. The hairs on the ventral surface of the tarsi are almost simple; on each side of the claw there is a strongly curved hair corresponding to the bifurcated one found in *Ch. cancroides*, L. (*cf.* p. 120). The tarsus of the fourth pair of legs has some longer pointed hairs near the claws, but does not bear an inner "tactile" hair, in contrast to most other species with the exception of *Ch. cimicoides*, F. The trochantin of the first pair with a well-marked stalk. The tibia, which is distinctly longer than the tarsus, is, like the latter, enlarged distally; this difference in length between the two segments is, as usual, yet more marked on the fourth pair of legs.

*Colour*.—The maxillæ, palps, and cephalothorax are bright reddish brown (the two black transverse grooves excepted); the coxæ and legs are lighter; the sclerites of the abdomen

are yellowish brown, but sometimes with a blackish shade; longitudinal line white.

*Measurements*.—Cephalothorax 1.54 (1.54); abdomen 3.0 (2.38) mm.

Palps: trochanter 0.738 (0.590); femur 1.40 (0.644); tibia 1.484 (0.728); hand 1.372 (1.092), height 1.222; finger 1.232 mm.

Leg i.: femur 1.12 (0.308), trochantin 0.504; tibia 0.840 (0.196); tarsus 0.728 (0.144) mm.

Leg iv.: femur 1.484 (0.392), trochantin 0.476; tibia 1.26 (0.224); tarsus 0.868 (0.171) mm.

*Material &c.*—Two males of this species, which seem to be related to *Ch. cimicoides*, F., were collected by Mr. W. W. Froggart in Queensland.

*Chelifer hawaiiensis*, E. S.

(Pl. VI. fig. 3 a; Pl. VII. figs. 1 a-f.)

1900. E. Simon, (9) p. 518.

*Cephalothorax*.—No eyes or ocular spots are visible. The cephalothorax, which is a little longer than broad behind, is provided with two transverse grooves; these are slightly curved forwards, but the hinder is very indistinct. The skin is minutely granular; short, distally enlarged, and dentated hairs are abundant.

*Abdomen*.—The abdomen, which is distinctly longer than broad, has its tergites of almost equal breadth, with the exception of the first three, which are a little shorter; the front as well as the hinder margins of all the tergites are almost straight. The sclerites are indistinctly developed, as in so many forms of *Garypus*, minutely granular, and provided with a row of short hairs along the hindmost margin. The sternites (iv.-xi.) are similar to the tergites. The genital area is rather indistinct in the type specimen, but seems to be similar to that of the other female. In this we observe a plate, the hindmost margin of which is strongly chitinized and with a row of hairs. Between this plate and the coxæ we find a number of rather stout pointed hairs, articulated in deep and wide cavities.

*Antennæ*.—The galear is broken distally, but seems rather stout and with a short branch near the base.

*Maxillæ*.—The maxillæ are short and broad; they are shagreened laterally, but smooth in the middle, and provided with a few short pointed hairs.

*Palps* (fig. 1 a).—Only the exterior surface of the tro-

chanter and the interior of the femur and tibia are minutely shagreened; the low flat granules of the hand are very indistinct. Rather short and more or less dentated hairs are abundant everywhere; those of the fingers, which, besides, bear tactile hairs, are more slender and simpler. The arrangement of the tactile hairs (Pl. VI. fig. 3 *a*) seems to be similar in the two specimens: most conspicuous are two placed very near to each other at the base of both fingers exteriorly; two others are placed more distally on each finger. Interiorly there are two close to each other near the base and a single one distally; dorsally there are a few. The *trochanter*, which has a long stalk, is distinctly longer than broad; its inner surface is evenly convex to near the tip; the outer is suddenly convex, almost similar to a protuberance; under this and separated from it by a longitudinal depression there is a less-marked more even convexity, which is, perhaps, the real exterior outline of the joint. The *femur* has no marked stalk, is narrower than the trochanter, and about 4.5 times longer than broad distally; it is gradually enlarged distally; the inner surface is, after a shallow notch and low elevation, almost straight; the outer is, beyond a basal short concavity, almost straight proximally, but distinctly convex distally. The *tibia*, which has a rather short and not very well-marked stalk, is a little shorter and broader than the femur; the inner surface, beyond the distinct basal notch, is almost straight; the outer has a well-marked basal prominence and a low elevation where the stalk passes into the joint proper; between these two there is a shallow notch; the outline, beyond the above-mentioned elevation, is almost straight and at last convex. The *hand*, which is as long as but only 1.46 broader than the tibia, is slightly convex interiorly, but almost straight exteriorly; it is 2.5 longer than broad, a little broader than it is high, and a trifle longer than the fingers, which gape slightly when closed. Besides the usual marginal row of teeth, which are rounded basally and conical distally, the fingers bear accessory teeth, the number and position of which differ in the two specimens examined. The one (Pl. VI. fig. 3 *a, a*) had along the inner side of the immovable finger eight teeth, of which the first three near the middle were divided distally; the movable finger possesses four inside. Exteriorly the immovable finger bears about nine accessory teeth and the movable four; all these are placed more or less near to the middle. In addition to these teeth we find a number of organs (fig. 3 *a, a*) which seem to bear some similarity to those described by Hansen (15, p. 217). The other specimen differs from that described

in minor details with regard to the number and arrangement of these teeth.

*Coxæ*.—The coxæ are very similar to those of *Ch. australiensis*, sp. n. (Pl. VI. fig. 2 a), but are more slender; the third is not so broad distally as the second, and the fourth pair not enlarged towards the extremity.

*Legs* (figs. 1 b-d).—The rather short hairs of the first pair of legs are almost simple ventrally, but with a distal tooth, or broken dorsally; the hairs of the fourth pair of legs, at least along the dorsal side of the femur and tibia, are distinctly enlarged distally and provided with a distal and some lateral spines. The dorsal "tactile" hair of the fourth tarsus is wanting, unless a rather short, pointed, and simple one near the base of the claws represents it; I was not able to make out whether this hair was paired or single. The hairs which are found on each side near the base of the claws are moderately curved and without a distinct tooth distally (fig. 1 d). The claws are very slender and longer than the areola. The legs are exceedingly long and slender. The trochantin of the first pair of legs (fig. 1 b) is rather short; the femur is much longer (5·3) than high; the tibia, which is moderately enlarged distally, is a trifle longer than the tarsus. The trochanter of the fourth pair of legs (fig. 1 c) is almost twice as long as high; the femur is much (4·3) longer than high, and only 1·7 times longer than the tarsus; the tibia is distinctly longer than the tarsus, which is 2·6 longer than the femur is high.

*Colour*.—The palps, maxillæ, and cephalothorax are pale yellowish brown; the femur and tibia are lighter than the other joints of the palps. The abdomen is brownish in the one specimen with indistinct darker spots, in the other more yellowish with more distinct dark sclerites. The coxæ and legs are yellowish.

*Measurements*.—Cephalothorax 1·4 (1·3); abdomen 3·6 (2·0) mm.

Palps: trochanter 0·700 (0·420); femur 1·624 (0·344); tibia 1·316 (0·364); hand 1·344 (0·532), height 0·504; fingers 1·092 mm.

Leg i.: femur 0·960 (0·180), trochantin 0·356 (0·204); tibia 0·616 (0·130); tarsus 0·588 (0·100) mm.

Leg iv.: femur 1·134 (0·252), trochantin 0·392; tibia 0·840 (0·150); tarsus 0·672 (0·120) mm.

*Material*.—I have examined two females: the one, which is probably Simon's androtype, is dilated by eggs; the other, which has a small bundle of eggs attached to the genital area,

has a smaller abdomen, with more distinct colours and slightly longer palps.

### Variety.

*Cephalothorax*.—The transverse grooves are very indistinct, but the granulation much better marked.

*Abdomen*.—The first three very short tergites have the hindmost margin distinctly convex and the foremost concave; the median tergites have both margins more or less straight, while the last ones have the anterior margin convex and the posterior concave. The sclerites are well developed and divided by a broad longitudinal line where the skin is distinctly reticulated. The hairs are evidently clavate; the eleventh tergite possesses a number of very small round spots similar to those found in *Ch. equester*, sp. n. (cf. p. 124). The genital area seems to be different from that found in the typical specimen.

*Antennæ* (Pl. VII. fig. 1 e).—The *flagellum* is composed of four hairs, of which the anterior longer one bears many marginal teeth, while the second has only a few. The *lamina interior* has at least three distal lobes with very long teeth; the terminal spine is shorter, distinctly hooked, and provided with six long teeth. The *galca* (fig. 1 e) has some few teeth distally and is a little longer than the hair at its base. The teeth of the *serrula* (fig. 1 e) are high, the terminal is pointed, and the basal is only slightly enlarged distally.

*Maxillæ*.—The maxillæ are not only beset with granules laterally, but bear also some larger protuberances.

*Palps*.—The granulation, especially that of the hand, is more pronounced, and the hairs, especially those from the inner surface of the femur, are distinctly clavate. The tactile hairs of the fingers seem to be arranged as described (p. 105). The joints are comparatively shorter and broader; this difference is especially marked on the *hand*, which is 1·6 times broader than the *tibia* and only 2·1 times longer than broad; the margins, especially the inner, are a little more convex; the number of secondary teeth of the fingers is very different; interiorly I was not able to discover any, but exteriorly the immovable finger bears at least six and the movable four.

*Legs*.—The hairs of the legs are more distinctly clavate; the lateral hairs near the base of the claws are more curved (fig. 1 f). The legs are comparatively shorter and higher—for instance, the femur of the first pair of legs is only 4·4 longer than high.

*Colour*.—The palps and maxillæ are reddish brown; the

cephalothorax is a little paler; the abdominal sclerites are brown, with a white and a black spot and divided by a broad, white longitudinal line.

*Measurements.*—Cephalothorax 1.344 (1.12); abdomen 2.128 (1.820) mm.

Pulps: trochanter 0.616 (0.392); femur 1.344 (0.300); tibia 1.176 (0.320); hand 1.092 (0.504), height 0.476; fingers 0.980 mm.

Leg i.: femur 0.786 (0.178), trochantin 0.308; tibia 0.532 (0.130); tarsus 0.476 (0.084) mm.

Leg iv.: femur 0.972 (0.252), trochantin 0.364; tibia 0.756 (0.140); tarsus 0.616 (0.112) mm.

*Material.*—I have examined one specimen (♀) of the variety from Kauai, one of the most western islands of the Sandwich Archipelago.

*Remarks.*—As I have only seen three specimens of this species, I have not thought it advisable to establish the variety as a new species; but, on the other hand, as the differences seem to be well marked and as the specimen is from another locality, I think that the description of the differences will be of value to future workers. It would be interesting to investigate the relation between the geographical distribution and the variations.

*Chelifer pacificus*, sp. n. (Pl. VII. fig. 2 a.)

*Cephalothorax.*—No eyes or ocular spots are present. The cephalothorax is a little longer than broad; it is more distinctly produced in front and with a better-marked median incision than *Ch. hawaiiensis*; the almost straight transverse grooves are indistinct; the skin is distinctly but minutely granular and the distinctly clavate hairs are almost as long as broad.

*Abdomen.*—The abdomen is distinctly longer than broad; the tergites have their sclerites poorly developed, and the first three are only in a slight degree shorter than the other; both the anterior and the posterior margins are almost straight. The whole surface of the tergites, including the indistinct longitudinal line in the middle, is shagreened. Eight transverse rows of clavate hairs are present as well as some few hairs (lateral) in front of the row on the median segments. Genital area scarcely different from that found in *Ch. hawaiiensis*, Sim.

*Antennæ.*—The *flagellum* consists of four hairs. The *lamina interior* possesses three or four lobes, the teeth of which are comparatively short; the terminal spine, which is

rather thick and suddenly pointed, is not crooked and is provided with five teeth. The *galea*, which is rather slender and a little longer than the hair at its base, is provided with five teeth distally. The 21 teeth of the *serrula* are moderately long; the basal one is longer and is slightly and evenly enlarged towards the extremity.

*Maxillæ*.—The maxillæ are shagreened laterally.

*Palps* (fig. 2 a).—The palps are minutely granular, especially the inner surface of the joints, with the exception of the trochanter, which is shagreened posteriorly. The hairs are rather short, widened out and spinous distally. The number and the arrangement of the tactile hairs of the fingers are as in *Ch. hawaiiensis*, Sim. The *trochanter*, which is longer than broad and distinctly stalked, is strongly but evenly convex interiorly; the exterior outline is more abruptly convex, and the distinction between the upper prominence and the lower, which passes into the stalk, is well marked. The *femur*, which has a short stalk and is narrower than the trochanter, is 3·6 times longer than broad; it is not gradually and distinctly widened out towards the extremity; the inner outline is almost straight; the convexity of the outer side begins just beyond the notch which marks off the stalk. The *tibia*, which has a short, not very well-marked stalk, is distinctly shorter and a little broader than the femur; both the inner and the outer margins are slightly convex. The *hand*, which is as long as, but 1·6 times broader than, the tibia, is distinctly convex both interiorly and exteriorly; it is 1·9 times longer than broad, a little broader than high, and scarcely longer than the fingers, which do not gape when closed. In position and number the accessory teeth differ from those described under *Ch. hawaiiensis* (p. 105); the immovable finger has along the inner margin at least three distally, and the movable one; the former has at least five exteriorly.

*Legs*.—The hairs of the ventral side are pointed, long, and more or less simple, while those of the dorsal side are shorter, widened out, and provided with teeth. The dorsal "tactile" hair of the fourth pair of tarsi is wanting. The lateral hairs near the base of the claws are slightly curved, very similar to those of *Ch. hawaiiensis*, Sim. (Pl. VII. fig. 1 d). The legs are moderately long; the trochanter of the fourth pair of legs is only 1·5 longer than high. The femora of the first as well as of the fourth pair are only four times longer than high; the tibiæ are distinctly longer than the tarsi.

*Colour*.—The maxillæ and palps are brown, the former more brilliant; the cephalothorax and abdomen are brownish,



the latter more pale with darker spots; the coxæ and legs are yellowish brown.

*Measurements*.—Cephalothorax 1.036 (0.980); abdomen 2.10 (1.316) mm.

Palps: trochanter 0.532 (0.336); femur 0.924 (0.260); tibia 0.832 (0.280); hand 0.840 (0.448), height 0.392; fingers 0.820 mm.

Leg i.: femur 0.626 (0.155), trochantin 0.280 (0.175); tibia 0.420 (0.112); tarsus 0.392 (0.084) mm.

Leg iv.: femur 0.840 (0.210), trochantin 0.300; tibia 0.616 (0.120); tarsus 0.524 (0.110) mm.

*Material*.—I have examined a single female, probably from Hawaii; it was mounted with Simon's original specimens of *Ch. hawaiiensis*, but evidently had not been examined by him.

#### *Chelifera brevispinosus*, Keys.

1885. Keyserling, (3) pp. 45-46, tab. iv. figs. 3-3 c.

♂.—The hand is scarcely as high as broad; the fingers gape distinctly when closed, especially distally, on account of a notch just behind the tip of the immovable finger; the inner margin at least of the fingers with a number of accessory teeth. The trochanter has posteriorly a lower, almost subconical projection and an upper, bigger and more rounded one. The legs are moderately short; the femur of the fourth pair is about 2.5 longer than high, and the tibia is much longer than the tarsus, which bears a tactile hair near the middle; the lateral hairs, near the base of the simple claws, are slightly curved and simple.

♀.—The fingers of the palps gape slightly.

I have examined Keyserling's original specimens.

#### *Chelifera pygmaeus*, Keys.

1885. Keyserling, (3) pp. 49-50, tab. vi. figs. 8-8 b.

The last abdominal segment bears some "tactile" hairs. Trochanter with well-marked exterior tubercles. The fingers are almost as long as the broad hand, and bear a few accessory teeth on the distal half. The first pair of legs, the femur of which is 2.5 times longer than high, have the femur proper, tibia, and tarsus of almost equal length; the tarsus of the fourth pair of legs with a dorsal "tactile" hair in the basal half near the middle.

I have examined Keyserling's original specimens.

*Chelifer pallipes*, White\*. (Pl. VII. figs. 3 a-b.)

1849. A. White, (1) p. 6.

*Cephalothorax*.—Two distinct eyes or ocular spots are present. The cephalothorax seems to be longer than broad behind, and becomes rather suddenly narrow in the anterior third. The head slopes towards the front margin; a distinct transverse groove, which is curved backwards in its whole length, is found near the middle; a second groove near the hindmost margin is indistinct and straight, as far as I could make out. The cephalothorax is everywhere distinctly granular.

*Abdomen*.—The granulation is less distinct and there seems to be a broad longitudinal line.

*Antennæ*.—The moderately long galea possesses at least four distal branches.

*Palps* (figs. 3 a-b).—The palps appear quite polished; but are nevertheless granular, the granules being so low and so near to each other that the whole surface appears to be covered with a minute mosaic. The hairs, especially those of the inner surface of the femur and tibia, are exceedingly long and pointed; at least most of the hairs bear one terminal tooth; the hand has also tactile hairs in addition to the ordinary kinds. The palps are rather long and slender. The *trochanter*, which has a long stalk, is distinctly longer than broad; the inner side is evenly convex, while the outer side is abruptly convex, but not so marked that we can speak of a lower posterior tubercle; the dorsal surface posteriorly and near the tip is slightly prominent like an upper tubercle. The *femur*, which has a short distinct stalk, is slightly broader than the trochanter and almost three times as long as broad; the inner side beyond the moderately concave stalk is slightly convex for a very short distance, but thereafter almost straight; the outer side just beyond the stalk is rather suddenly, but more distally evenly convex. The *tibia*, which is both shorter and broader than the femur, has a long, well-marked stalk; the inner side, after the deep notch of the stalk, is distinctly convex; the outer side has a well-marked basal prominence and a rather low elevation separated from the former by a shallow notch before the moderate convexity of the joint proper. The *hand*, which is almost as long as, but distinctly broader than, the tibia, is distinctly longer than, and as high as, the finger.

\* The name of *Ch. pallipes*, Bks., from America (Canad. Entomologist, vol. xxv. 1893, p. 64), must be changed.

*Coxæ*.—The fourth pair of coxæ is broad and widened out distally.

*Legs*.—The trochantin of the first pair of legs is short and its tibia is distinctly longer than the tarsus. The femur of the fourth pair seems to be exceedingly long and compressed; there does not appear to be any "tactile" hair at the base of the tarsus.

*Colour*.—The cephalothorax, palps, and abdomen (according to White's description) are deep brown; the legs are pale. "The claws with a greenish hue . . . ; abdominal segments edged with palish" (White, *op. cit.* p. 6).

*Measurements*.—Cephalothorax about 1 mm. long.

Palps: trochanter 0.600 (0.392); femur 1.176 (0.420); tibia 1.092 (0.476); hand 1.064 (0.588), height 0.824; finger 0.784 mm.

*Material*.—I have examined White's typical specimen from New Zealand; it was dried and badly damaged. I hope it will be possible to recognize it from my description; it would probably have been impossible to do so from the very short description given by White.

#### *Chelifer brevidigitatus*, Keys.

1885. Keyserling, (3) pp. 48-49, tab. iv. figs. 6-6 c.

The tubercles of the trochanter of the palps are slightly marked; the femur is twice as long as broad; the hand is higher than broad and 1.4 longer than the fingers. The tarsi of the legs are much shorter than the tibiæ; the fourth pair has a dorsal "tactile" hair at the base; the lateral hairs near the base of the claws are strongly curved. The genital area is similar to that of *Ch. birmanicus*, Thor. The abdomen of the female is exceedingly long and slender.

I have examined Keyserling's original specimens.

#### *Chelifer socotrensis*, sp. n. (Pl. VII. figs. 4 a-h.)

♂. *Cephalothorax*.—Two distinct eyes are present. The cephalothorax, which is slightly longer than broad, becomes gradually narrower towards the front margin, which is bordered with a clear membrane. The anterior transverse groove is always straight in the middle, while the second is moderately curved forwards; the second tergite with a more or less indistinct longitudinal groove. The skin is everywhere granular, with rather large and low granules, which are always well separated from each other. The short clavate hairs of the head and first tergite are placed without order

everywhere, while a row of eighteen are placed along the hinder margin of the second tergite.

*Abdomen.*—The abdomen is rather slender, with all the dorsal sclerites of almost equal breadth and length, with the exception of the first three, which are shorter; the tergites show scarcely any trace of lateral keels. All the tergites are, with the exception of the hindmost portion of the eleventh, divided by a distinct longitudinal line. The granules are perhaps lower than those of the cephalothorax and arranged in circles around the smooth spots which surround the lyriform fissures and the articulation of the more or less short, distally dentated hairs. These are situated in the following order:—the first two tergites bear only a row of about eighteen hairs along the hindmost margin of the sclerite; this row is at the third tergite not quite straight, and each half has at least an inner and an outer hair in front of the row: the fourth to the eighth have, in addition to the hindmost marginal row, five hairs on each side in front of the row, placed in an irregular transverse row; the order of these hairs is not quite symmetrical right and left; the right half of the sixth tergite possessed, for instance, in one specimen only four hairs. In the ninth and tenth sternites the two rows were not well marked off from each other; the light spots which surround the hairs are better marked in the anterior than in the posterior row; the hairs of the hindmost tergites are longer, and the eleventh bears a pair of tactile hairs.

*Sternites.*—The fifth to the eleventh sternites are similar to the tergites and longitudinally divided like these; but the granulation is more obsolete, and the hairs, of which there is only one row along the hinder margin, are longer and more slender; those of the anterior sternites are almost simple. The twelfth sternite seems to be missing, or, more correctly, it is fused with the eleventh; for the latter has in the middle, just in front of the hindmost margin, a short transverse groove, partly cutting off its hindmost median portion. The fourth sternite has the anterior margin curved inwards. The genital area is composed of a rather short anterior plate and a longer posterior one; the former has many long slender hairs in the middle, while the latter has short hairs everywhere and covers a pair of “ram’s-horn”-shaped organs (cf. *Ch. canceroides*, L.).

*Antennæ.*—The *flagellum* seems to consist of only three hairs, of which the anterior longest one is armed with about nine teeth along the front margin, thus having similarity to a feather. The dorsal margin of the immovable finger possesses some tiny teeth just behind the tip, and thereafter five

larger ones; the first is the largest and the second is smaller than the third. The serruliform portion of the *lamina interior* consists of four dentated lobes and a terminal spine with six teeth. The *galea* was broken. The *serrula exterior* is composed of about 30 teeth, of which the basal one has a large distal flap.

*Maxillæ*.—The maxillæ are of the usual triangular shape, with a broad lamina dentated externally; they are granular along the sides, and hairy with short dentated hairs.

*Palps* (fig. 4a).—The palps are minutely granular everywhere above, with the exception of the hand, fingers, and stalks; the granulation is very indistinct beneath. Short, rather thick, distally dentated hairs are abundant at all the joints, with the exception of the fingers, which bear rather long and slender hairs, besides the tactile hairs. There is no difference in length between the hairs on the inner and outer sides of the proximal joints. The *trochanter*, which is distinctly longer than broad, has a well-marked stalk; the inner margin is gradually convex, and so is the hinder; the upper surface is posteriorly raised to a blunt tubercle. The *femur*, which is almost four times longer than broad and distinctly broader than the trochanter, has no well-marked stalk; its inner side is almost straight beyond a low short convexity near the base, while the hinder is moderately convex. The tibia, which is as long as but broader than the femur, has a rather short but distinct stalk; its inner side is moderately convex after the deep notch of the stalk; the basal exterior prominence which forms part of the articulation is well marked, as well as the distal elevation of the stalk and the rather shallow notch between; the outline of the proper joint, which passes gradually into this elevation, is first straight and terminally convex. The *hand*, which is twice as long as broad and broader than the tibia, is 1.78 longer than the fingers; it is slightly longer than the cephalothorax and evenly convex both interiorly and exteriorly. The fingers do not gape when closed and are only 1.25 longer than the hand is broad.

*Coxæ* (fig. 4b).—The coxæ are scarcely different from those of *Ch. australiensis*, with the exception of the fourth pair, which is much broader than the third and only slightly widened out distally; the inner side is straight and makes an obtuse angle with the hinder margin, which is slightly concave and almost parallel with the convex front margin.

*Coxal sac* (figs. 4c-f).—Compare p. 135.

*Legs* (fig. 4g).—The legs are comparatively long and slender. The hairs, which are found in numbers, are rather

short, thick, and provided with spines distally; those which are placed on the ventral surfaces of the tarsi are long, slender, and almost or completely simple; the trochanter bears also some longer and pointed hairs beneath. The dorsal "tactile" hair of the fourth pair of legs is placed near the tip. All the tarsi bear at least one hair, which is rather long and slender, on each side just above the base of the claws; besides these hairs there is on each side a differently shaped bifurcated hair. The posterior of these hairs, which seems to be alike on all the tarsi, is moderately long and divided near the tip into two branches, of which the lower and longer one is directed upwards and curved downwards, while the upper one is short and similar to a short tooth. The anterior hair has the lower branch short and straight on at least the fourth pair; that of the first pair of legs seems to bear several tiny teeth distally. The two long claws of the fourth pair of legs are as long as the areola and are armed with an anterior strong tooth. The anterior claw of the first pair is rather long and slender without any tooth, while the posterior is exceedingly long and slender, bearing an insignificant tooth inside. The claws of the second pair of legs bear comparatively well-developed teeth. The tibia of the first pair is only a trifle longer than the tarsus, which is broadest in the middle (fig. 4g), while the tibia of the fourth pair is considerably longer than the corresponding tarsus.

*Colour*.—The hand is reddish brown, the other joints, including the maxillæ, are lighter, and so is the head; the thorax and abdominal tergites are yellowish brown with the less chitinized portions paler; the ventral side and legs are yellowish.

*Measurements*.—Cephalothorax 1.26 (1.134); abdomen 2.156 (1.372) mm.

Palps: trochanter 0.730 (0.418); femur 1.556 (0.448); tibia 1.540 (0.476); hand 1.40 (0.630); fingers 0.790 mm.

Leg i.: femur 0.765 (0.252), trochantin 0.420 (0.270); tibia 0.565 (0.207); tarsus 0.495 (0.140) mm.

Leg iv.: femur 1.232 (0.420), trochantin 0.40; tibia 0.952 (0.252); tarsus 0.616 mm.

♀. *Cephalothorax*.—The cephalothorax is as broad behind as it is long. The eyes and transverse grooves seem to be more distinct.

*Abdomen*.—The sclerites of the fourth sternite are short and widely separated from each other; many short pointed hairs along the hindmost margin of the sternite; the third sternite bears a similar row of hairs, and in front of the

genital opening there are a number of irregularly placed hairs.

*Palps.*—The palps are shorter and less powerful and there are small differences in the relative measurements. The dorsal prominence of the *trochanter* seems to be smaller, but more marked off; the hand is, compared with the tibia, both longer and broader than in the male; it is as high as broad.

*Coxæ.*—The fourth pair of coxæ has the hindmost margin straight and does not possess any coxal sac.

*Legs.*—The claws of the first (and probably also the second) pair of legs are different from those of the male; both claws bear teeth, but that of the posterior claw is placed under the summit, not anteriorly as usual. The first pair of legs differs from those of the male by the greater slenderness of the tibia and tarsus (fig. 4*h*), as well as by the shape of the latter, which is of equal breadth throughout.

*Colour.*—The palps and maxillæ are dark reddish brown, with the hands darker; the head and last abdominal tergites dark, more blackish brown, while the thoracic and first three abdominal tergites are lighter, the latter with white inter-articulate membranes. The coxæ and foremost part of the abdomen below are yellowish, while the hindmost portion is brownish.

*Measurements.*—Cephalothorax 1.232 (1.260); abdomen 2.20 (1.596) mm.

Palps: trochanter 0.660 (0.364); femur 1.350 (0.40); tibia 1.354 (0.455); hand 1.326 (0.675), height 0.672; fingers 0.765 mm.

Leg i.: femur 0.765 (0.243), trochantin 0.405 (0.265); tibia 0.600 (0.168); tarsus 0.532 (0.112) mm.

*Material.*—I have examined two males and one female, which are perhaps not quite full-grown, from Socotra.

*Remarks.*—This species is very similar to *Ch. Simoni*, Bal., from Sierra Leone (11, p. 529). The following are my reasons for establishing a new species:—*Ch. Simoni*, of which Balzan has examined full-grown specimens, is a much smaller species; its cephalothorax is distinctly longer than broad, both in male and female; the median abdominal tergites have only three hairs in front of the row along the hindmost margin of the sclerite; the fingers are distinctly longer than the hand is broad; the hand is shorter than the cephalothorax; the hairs along the inner side of the palps are distinctly longer than those along the outer.

*Chelifer sculpturatus*, Lewis. (Pl. VIII. figs. 2 a-h.)

1903. Lewis, (16) pp. 497-498, pl. xxv.

♀. *Cephalothorax*.—The two rather indistinct *eyes* or ocular spots are removed from the front margin a distance equal to their diameter. The cephalothorax, which is as broad behind as it is long, is only one-fourth as broad anteriorly as posteriorly; the front margin possesses a slight median incision. The foremost of the two rather shallow transverse *grooves* is straight or moderately curved backwards, while the hinder is distinctly curved forwards, and so is also the hindmost margin of the second tergite, which is so similar to an abdominal tergite that Lewis counted it amongst them.

The skin of the head, the first and in a less degree the second thoracic tergite are everywhere beset with very minute granules. The first thoracic tergite and at least the hindmost part of the head bear besides a number of low, round, and rather large granules and tubercles; the tergite possesses about fifty, while the head has comparatively few, which decrease in number as well as in size anteriorly. The cephalothorax bears some few rather slender, but blunt hairs, which, at least posteriorly, are placed each on its own tubercle. The granulation of the second tergite is so similar to that of the abdominal tergites that I can refer to the description of these.

*Abdomen* (fig. 2 a).—The abdomen, which is broader in the middle than it is long, is shaped similarly to that in *Chiridium*; it slopes gradually from the middle towards the sides, and from the seventh tergite both forwards and backwards; the lateral outline is distinctly convex. The tergites slightly increase in length from the first towards the ninth, but much more in breadth towards the seventh. The second thoracic as well as the first ten abdominal tergites bear a pair of lateral, more or less marked projections.

Each abdominal tergite, with the exception of the eleventh, is divided into a posterior and an anterior portion by a transverse raised band or line, which is more zigzag than straight. These two portions are again subdivided into more or less round areas by short ridges, neither so raised nor so broad as the transverse band, between which and the margins they extend. The depressed spots thus formed bear each a median knob, on which, at least sometimes, a short clavate hair is articulated: in each row about twenty of these areas are present; but they are sometimes rather indistinct, especially those of the anterior row, which are often covered



by the hindmost margin of the preceding tergite. The depressions described are minutely granular in a similar manner as is the head. The eleventh tergite is smooth.

*Sternites*.—The fifth to the eleventh sternites increase both in length and in breadth towards the middle. Both the fourth and the third sternites are more or less covered by the fourth pair of coxæ. The sclerites of the former are distinctly narrower and only half as long as those of the fifth; the sclerite of the third sternite is almost a mere line. The sclerites of the sternites seem to be smooth, are provided with a hinder row of numerous, short, and almost simple hairs, and are divided by a narrow longitudinal line.

*Antennæ*.—The minute organs of the small antennæ were so badly preserved on the dried specimen at my disposal that I could not examine their structure in detail. The *flagellum* is composed of three (?) moderately long, curved, and slender hairs, of which the anterior one is provided with about five distal and marginal teeth. The margin of the immovable finger is provided with two minute dorsal teeth just behind the tip and more proximally five larger but of unequal size. A distinct but narrow *lamina exterior* is present as well as a *lamina interior*, the serruliform distal portion of which seems to differ from that usually found in *Chelifer*. The *galea* is rather long and slender, distally provided with about seven short, blunt, and slightly curved teeth. The *serrula exterior* is similar to that found in *Ch. claviger*, Thor.; it consists of about thirty, almost completely fused teeth, of which the basal one is the longest and widened out distally; the terminal tooth is also comparatively long and slender.

*Maxillæ*.—The maxillæ are placed on a level with the coxæ; they are strongly raised in the middle, pointed in the front, and, at least in some specimens, with large granules laterally.

*Palps* (figs. 2 *d-e*).—A minute granulation, similar to that of the head, seems to be wanting, but the whole surface is thickly studded with subconical tubercles; these tubercles are comparatively low on the trochanter, and almost wanting on the ventral side of the femur and tibia; some few low ones are found at the basal portion of the hand. Each tubercle bears a moderately long, stiff, and clavate hair near the tip; the hairs of the hands, especially those of the inner side, are more slender, not clavate, but only provided with some few distal spines. This kind of hair is gradually merging into the simple and pointed hairs of the fingers, and is not to be confounded with tactile hairs. On the fingers of a cast skin (fig. 2 *e*) I observed in number a kind of organs

identical with or similar to those described by H. J. Hansen in *Ch. cimicoides* (15, p. 218, pl. v. fig. 14 a). Each organ consists apparently of a more or less irregularly shaped area with a marked round spot; they are either apart or more or less fused; the area itself is in reality placed under the skin as a kind of chitinous sac. The immovable finger has inwards two tactile hairs and about eight of these organs, placed in the proximal portion; the movable has none; the immovable as well as the movable possess outwards three tactile hairs and twelve organs. The *trochanter*, which is distinctly longer than broad, has a distinct stalk, which is enlarged basally; the interior margin is first suddenly and then gradually convex; the exterior surface bears an upper and a lower projection, the latter is the longer, but neither the one nor the other is much more marked than one of the femoral tubercles. The *femur*, which is a little more than twice as long as broad, and distinctly broader than the trochanter, is provided with an exceedingly short stalk; the tubercles make it difficult to realize its shape, but the interior side seems to be almost straight, while the exterior is slightly convex. The *tibia*, which is slightly shorter but broader than the femur, has a moderately long, well-marked stalk, the axis of which forms an obtuse angle with the proper joint, and accordingly gives the tibia an inward direction. The interior side is moderately convex after the deep notch which marks it off from the stalk; the exterior side is almost straight beyond a sudden elevation which follows the stalk. The *hand*, which is slightly shorter and a little broader than the tibia, is as high as broad and longer than the fingers. The inner curvature is more marked than the outer. The *fingers* (fig. 2 e) gape widely when closed, because the lower margin of the immovable finger is not straight, but with a distinct bend upwards behind the tip. The proximal teeth of the immovable finger are small and more or less rounded; those of the notch are extremely small, but they are followed by large and pointed ones; the teeth of the movable finger are all more or less minute.

*Coxæ* (fig. 2 f).—The coxæ are on a level with the maxillæ; the first pair is the shortest and trapezoid in shape; the second and third pairs are longer and enlarged distally, so that they become nearly triangular. The fourth pair is both broader and longer than the preceding ones (fig. 2 f); they are much longer in front than behind; the hindmost shorter portion is distinguished from the anterior portion by a shallow groove; both the interior and posterior margins with low concavities. While the hairs of the first three pairs of

the coxæ are short and spined, those of the fourth pair are longer and more slender.

*Legs.*—The ordinary hairs of the legs are rather short, stiff, and clavate; they are enlarged terminally and there provided with short branches in all directions. The ventral hairs of the tarsus are much longer and more slender than the dorsal ones; they are not simple, but spined distally. The claws seem never to bear teeth, but have an inner and outer bifurcated hair near the base as in *Ch. cancroides*, L. (Pl. VIII. fig. 2 *g*); this structure I have observed only in tarsi of a cast skin. The first legs have a very well-developed trochantin; the tibia is distinctly enlarged distally and as long as the tarsus. The fourth legs have the tarsus enlarged distally and shorter than the tibia.

*Colour.*—The palps, maxillæ, head, and coxæ are reddish brown, with a more or less pronounced purple shade. The raised band of the tergites is bright brown, while the depressed spots are more yellowish brown; sternites yellowish brown with a blackish shade. The whole dorsal surface is, when lighted, more or less metallic.

*Measurements.*—Cephalothorax 1·4 (0·42–1·68); abdomen 2·1 (2·492) mm.

Palps: trochanter 0·644 (0·448); femur 1·260 (0·540); tibia 1·148 (0·540); hand 0·982 (0·576), height 0·550; fingers 0·812 mm.

Leg i.: femur 0·840 (0·308); trochantin 0·392; tibia 0·560 (0·210); tarsus 0·560 mm.

Leg iv.: femur 1·094 (0·415); trochantin 0·336; tibia 0·728 (0·250); tarsus 0·600.

♂. *Cephalothorax.*—The anterior groove is distinctly curved backwards. The granulations are less marked than in the female.

*Abdomen.*—The lateral projections of the tergites are much better marked than in the female. That of the second thoracic tergite is comparatively insignificant; those of the abdominal tergites attain their highest development in the sixth and seventh segments, and are there long, free, and similar to a keel, directed obliquely upwards, outwards, and backwards. The raised transverse bands, and especially the hindmost row of depressed spots, seem less marked than in the females.

The fourth sternite differs from the corresponding one in the female by being half as long and almost as broad as the fifth.

*Genital area* (fig. 2 *b*).—The genital area is most similar to that found in *Chelifer cancroides*, L., and the species which are

nearly related to it. The *anterior genital plate* (fig. 2 *b, a*), which is hairy in the middle, is situated between the coxæ and the posterior plate; it is well raised in the middle, prolonged backwards with a low concavity in the posterior margin; the lateral part gets rather suddenly and most distinctly shorter. The *posterior genital plate*, which is broad and long, is distinctly wider than long; its hinder margin is moderately raised backwards, the lateral margin, after a shallow concavity in which the first pair of stigmata (*s.*) is partly placed, is suddenly bent inwards, merging into the anterior margin. This is distinctly curved forwards on each side, and in the middle provided with a well-marked curvature, which fits into the convexity of the anterior plate. The median and anterior portion of this system is more raised than the lateral and posterior region when seen from below. From the front margin to the middle a longitudinal shallow depression extends, having a moderate elevation on each side, which cover the usual ram's-horn-shaped organs. The posterior part of this plate is distinguished from the anterior plate by an indistinct transverse groove (fig. 2 *b, g*). Hairs are found at least along the front margin.

*Palps* (fig. 2 *d*).—The conical tubercles are larger than in the female. The palps are both longer and stronger. The *trochanter* has the interior margin more strongly curved and the stalk more distinct. The *femur* is very clumsy and scarcely twice as long as broad. The hand is comparatively broader and the fingers shorter than in the female.

*Coxæ* (fig. 2 *b*).—The first three pairs of the coxæ are shaped as in the female, but the fourth is very different. It is most narrow in the middle and enlarged towards both ends, slightly so inwards, but most distinctly outwards. The posterior side is distinctly concave, the anterior moderately convex, with a low median concavity. Near the interior posterior corner the entrance-opening (fig. 2 *b, c*) of the coxal sac is seen. This sac (comp. p. 135) is almost as long as the coxa, which it almost fills, and is enlarged distally; the inner wall is provided with many subconical elevations or tubercles, each bearing one or several hairs, which most often are bifurcated from the base or middle, but sometimes divided into several branches. Near the opening these eminences are arranged in a kind of half-funnel.

*Colour*.—The colour is perhaps more bright, especially the purple of the anterior portion of body.

*Measurements*.—Cephalothorax 1·4 (0·42–1·68); abdomen 2·24 (2·52) mm.

Palps: trochanter 0·812 (0·560); femur 1·51 (0·800);

tibia 1.4 (0.7); hand 1.12 (0.775), height 0.730; finger 0.870 mm.

*Young animal*.—I have not had any opportunity of examining young animals, but only cast skins. The abdominal tergites of these had neither raised bands nor depressed areas. The fourth pair of coxæ is neither similar to those of female nor male.

*Locality, Material*.—I have examined five females and two males, besides a number of silk-cocoons containing animals in process of moulting or cast skins. They were all taken in Natal from the interior of bee-hives.

*Remarks*.—This animal, in spite of some peculiarities, is most naturally referred to a group of species which are nearly related to *Ch. cancroides*, L. The following characters of the males are common to these species:—lateral tergal keels, shape of genital area with ram's-horn-shaped organs, shape of fourth coxæ with coxal sac, and bifurcated terminal tarsal hair. It is remarkable for the shape and granulations of body and palps, the broad coxæ of the female, and the shape of the posterior genital plate of the male.

*Ecdysis*.—Besides the animals which have been described, I have examined seven slightly curved circular silk-cocoons, which were sometimes placed two together. As they all contained animals in course of moulting, or cast skins, we must conclude that their purpose is to protect the animal during the dangerous process of ecdysis. These nidi show on microscopic examination a surprising structure, for the different threads are not independent and free, but are more or less fused, so that a complicated system or meshwork of thinner and thicker threads is formed (Pl. VIII. fig. 2 *h*). The density of the meshwork varies considerably in the different cocoons, and is not the same everywhere in each cocoon. The area between the threads is sometimes many times, sometimes scarcely broader than the threads. This structure is difficult to explain; the newly-formed threads have perhaps fused before drying.

I found only a single cast skin (palps and legs not attached) in a cocoon without any animal. This skin was closed, with the exception of a very wide aperture in front; this opening was formed by the bursting of the membrane between the head and first tergite dorsally, and antennæ and maxillæ ventrally. The articular membrane is strongly dilated just behind this opening. The tergites are separated from the cephalothorax by a deep groove, and so strongly curved (downwards) that the last abdominal tergites almost reach and cover the coxæ. The sternites are placed so closely to

the tergites that no room is left between; they are very difficult to distinguish from each other. The concavity of the sternites is consistently equal to the convexity of the tergites. The last two pairs of coxæ are, on account of the curvature, covered by the first two pairs, and not visible unless the whole animal be stretched out. The antennæ are without any connection whatever with the head, and fastened to the hindmost part of the maxillæ by a thin membrane. Other specimens were examined, which were killed during the moult. One, for instance, had the whole cephalothorax, front portion of abdomen, and femur of the palps free. The cast skin of the cephalothorax was placed as a cap on the top of its abdomen.

*Chelifer equester*, sp. n.

(Pl. VIII. figs. 3 *a-d*, Pl. IX. figs. 1 *a-f*.)

♂. *Cephalothorax*.—Two indistinct white *ocular spots* present. The cephalothorax, which is as broad behind as it is long, has the sides slightly curved outwards; in front they approach each other, so that the front is much shorter than the hinder margin. There are no transverse *grooves*, but the head is nevertheless very well marked off from the thorax by being darker and more raised. The skin is minutely dotted, and bears a few moderately slender and clavate hairs in front as well as along the hinder margin of the thorax.

*Abdomen*.—The abdomen is distinctly longer than broad, and its dorsal sclerites are of almost equal breadth, but the first three are much shorter than the following, which increase slightly in length towards the tenth tergite. The hinder margin of the sclerites of at least the first two tergites is raised. All the tergites from the fourth (third) to the tenth are divided by a longitudinal line, which is rather imperfect in the middle of each sclerite. The granulation is indistinct; each sclerite possesses a hinder row of twelve long, slender, and dentate hairs, each placed in the middle of a yellow spot; laterally at least one pair of hairs in front of the row on the hindmost segments; the hairs of eleventh tergite placed without order. Tenth and eleventh tergites with two pairs of exceedingly long and pointed "tactile" hairs. The fourth to the eleventh sternites are similar to the tergites, and, like them, longitudinally divided; but the fourth is much narrower than the others; the twenty-four hairs of each sternite, which are placed in transverse rows, are moderately slender and almost simple; the eleventh sternite bears at least three pairs of tactile hairs in addition

to the usual hairs, arranged without order. Besides, the eleventh sternite possesses a great many (about 200) round spots, each with a median fissure, much smaller than the usual "lyriform" fissures; the corresponding tergite bears a smaller number, and the tenth sternite about 70.

The genital area (Pl. VIII. fig. 3 *d*) is similar to that of *Chelifier birmanicus*, Thor., with a short backwardly curved third (?) sternite, and a long and broad anterior plate, between which is the opening; under the front plate several internal chitinous organs are seen.

*Antennæ* (fig. 3 *c*).—The *flagellum* probably consists of four hairs, like that of the female. The immovable finger bears three low blunt teeth just behind the tip, and thereafter five larger, decreasing in size backwards. The *lamina exterior* is well marked, and so is the *lamina interior*, the serruliform portion of which consists of six dentated lobes; the terminal spine bears many teeth internally. The short galea is provided with a few teeth (Pl. VIII. fig. 3 *c*): the serrula exterior (fig. 3 *c*) is very long and consists of 37 teeth, which are almost completely fused; the basal tooth is a good deal longer, enlarged distally, and provided with a membranous plate.

*Maxilla*.—The pointed distal portion of the maxillæ is well marked and provided with a broad lamina.

*Palps* (Pl. IX. figs. 1 *a-d*).—The palps are everywhere, with the exception of the stalks and partly of the fingers, provided with low granules; short and slender, but not quite simple, hairs are abundant; the tibia bears on the outer side near the base a pair of longer pointed hairs, and the fingers some tactile hairs. The *trochanter*, which is somewhat longer than broad, is provided with a distinct stalk. The inner margin is strongly convex; the outer surface possesses a high tubercle; the upper a similar one near exterior margin; there is a deep cleft between them. The upper tubercle (figs. 1 *a-b*), which is directed upwards and slightly outwards, is triangular and as high as trochanter is long, if measured from lower margin of segment to its top. The outer and lower tubercle is shorter, and its broad triangular base merges into a rather slender but blunt terminal projection (fig. 1 *a*). The *femur*, which is twice as long and somewhat higher than broad, is wider than the trochanter and provided with a distinct stalk; the latter merges gradually into the moderate convexity of the inner margin, which is followed by a slight concavity; the outer surface is regularly convex from the base to the tip. The upper side is much more suddenly and strongly convex than the outer,

while the lower surface is only slightly curved. The *tibia* (fig. 1 *c*) is as long as, but broader than, the femur, with a very long stalk. The inner side has first a very deep notch to mark off the stalk, and is then irregularly and strongly convex; near the tip there is a low concavity. The outer side is almost straight from the base to the middle, because both the basal projection and the elevation beyond it, which bears a rather long pointed hair (fig. 1 *a*), are low as well as the concavity between; from the middle to the tip the outline is distinctly convex. In lateral view both outlines are regularly convex, almost semicircular. The hand, which is as long as the tibia, but broader, is higher than broad, 1.6 times longer than broad, and 1.5 times longer than the fingers. It is moderately convex inwards, and strongly so outwards, as well as above and below.

*Coxæ*.—The coxæ are very similar to those of *C. australiensis* (fig. 2 *a*), but those of the second pair are broader than those of the third more triangular pair; the fourth pair (fig. 3 *d*) are broader, with the hinder margin, which is longer than the inner, slightly convex on the middle.

*Legs* (figs. 1 *e-f*).—The legs are rather short and clumsy. Their hairs are long, stiff, pointed, and almost simple. Near the base of claws a pair of simple strongly curved hairs, and near the base of the tarsus of fourth legs the usual interior and dorsal "tactile" hair. The long areola is shorter than the long claws. Both the tibia and tarsus of the first legs widened out distally, the former being much the longer; the tarsus of the fourth leg is comparatively much shorter than that of first pair, and scarcely longer than its femur is high.

*Colour*.—The palps and head have the surface polished, and are dark brown in colour, sometimes almost blackish, sometimes rather reddish; the maxillæ and the thoracic tergites are light reddish brown, with the posterior margin of the second tergite black. The abdominal tergites of a dull blackish-brown colour with white longitudinal line; the sternites are more yellowish brown, and so are the coxæ and legs, but lighter.

*Measurements*.—Cephalothorax 1.75 (1.75); abdomen 3.75 (2.5) mm.

Palps: trochanter 1.26 (0.98); femur 2.38 (1.224), height 1.40; tibia 2.42 (1.316); hand 2.38 (1.42), height 1.54; fingers 1.596 mm.

Leg i.: femur 1.56 (0.448); trochantin 0.728 (0.560); tibia 1.232 (0.308); tarsus 0.898 mm.



Leg iv.: femur 2.0 (0.819); trochantin 0.712; tibia 1.596 (0.42); tarsus 1.064 mm.

♀. *Abdomen*.—The genital area, which is covered by the fourth pair of coxæ, differs from that of the male.

*Antennæ* (Pl. VIII. figs. 3 a-c).—The flagellum (fig. 3 a) is composed of four hairs, of which the three posterior are simple and decreasing backwards, while the anterior is bifurcated and very much widened out in the middle, where about five larger and smaller pointed teeth are found. The serruliform part of lamina interior with five dentated lobes (fig. 3 b, s). The moderately long galea (fig. 3 c ♀) possesses about three rather long terminal branches, as well as some few distal, short, blunt teeth. The serrula exterior is composed of about 10 teeth.

*Palps* (Pl. IX. figs. 1 a-d).—The palps are much shorter than those of the males. The inner margin of the *trochanter* is gradually curved (fig. 1 b); the posterior and superior tubercles are comparatively lower than in the male. The posterior and inferior tubercle is rather low and blunt, while the superior is high and, in bearing a tooth-like projection, resembles the lower of the two prominences in the male. The *femur*, which is more than twice as long as broad, has the inferior and superior outlines much less convex than in the male. The upper and lower convexities of the tibia (fig. 1 c) more even than in the male. The hand is much broader than the tibia (1.35) and 1.4 times longer than broad.

*Coxæ* (Pl. VIII. fig. 3 d ♀).—The fourth pair is scarcely widened out distally and has the inner margin as long as the hinder.

*Colour*.—The colour is much lighter, especially on the palps, which are light reddish; the head is scarcely darker than the thorax. The ventral surface, including the maxillæ, is yellowish brown. There is great difference between the specimens, as the darkest amongst them are scarcely lighter than the males.

*Measurements*.—Cephalothorax 2.0 (2.0); abdomen 3.0 (2.5) mm.

Palps: trochanter 1.12 (0.728); femur 1.96 (0.84); tibia 1.932 (0.952); hand 1.876 (1.316), height 1.46; fingers 1.35 mm.

Leg i.: femur 1.4 (0.42), trochantin 0.616 (0.504); tibia 1.131 (0.308); tarsus 0.84 mm.

Leg iv.: femur 1.976 (0.817), trochantin 0.74; tibia 1.540 (0.364); tarsus 1.064 mm.

*Material*.—Mr. F. J. Jackson collected 8 ♀ and 13 ♂ beneath the elytron of a beetle at Taveta, Kilimanjaro.

*Remarks.*—This species, which seems to be related to *Ch. javanus*, Thor., is especially remarkable for the pronounced sexual difference in the structure of the palps. In spite of these differences, I have referred the males and the females to the same species on account of the great number in which they occur together, and the similarity in the rest of their structure.

*Ideoroncus mexicanus*, Bks. (Pl. IX. figs. 2 *a-d*,  
Pl. X. figs. 1 *a-f*.)

1898. N. Banks, (14) p. 289.

*Cephalothorax* (fig. 2 *a*).—Two well-developed *eyes*, placed at the lateral margin, and as far removed from the front margin as length of their diameter. The cephalothorax, which is distinctly longer than broad posteriorly, has parallel sides and is of almost equal breadth behind the eyes, but much narrower in front of them. Anterior margin is marked off from posterior part of head by a line; it is prolonged into a blunt "*epistoma*" and bordered with a thin membrane. The *skin* is smooth and provided with moderately long, pointed, simple hairs.

*Abdomen.*—The abdomen is distinctly longer than broad in the middle, where it is broadest, very narrow anteriorly, and thereafter almost oval with regularly curved sides. The tergal sclerites are in this specimen, which is dilated with eggs, much shorter than the thinly chitinized membranes between. The sclerites, especially of the anterior and posterior tergites, are indistinctly marked off, and the hindmost row of hairs is placed behind their posterior margin. There is a shallow longitudinal depression through the middle of each sclerite; the tergites seem to be smooth. Each tergite bears about four pairs of hairs, which are longer on the posterior tergites than on the anterior ones; the tenth and eleventh tergites each bear, in addition to these, two pairs of "*tactile*" hairs.

The sternites are scarcely different from the tergites, with the exception of the third and fourth, which are very narrow, indistinct, and divided in the middle.

The sides have well-marked grooves between the segments and possess densely placed, narrow, parallel and longitudinal ridges.

*Antennæ* (Pl. IX. figs. 2 *b-d*).—The fingers gape slightly when closed (fig. 2 *d*). The *flagellum* is composed of three short hairs, which are placed rather apart from each other and provided with some few tiny spines (fig. 2 *b*). The tip

of immovable finger long, slender, and moderately curved; behind the tip, and well removed from it, is situated a strong, conical, dorsal, marginal tooth, followed by about five more or less distinct low and rounded teeth (fig. 2 *d*).

*Serrula interior* (fig. 2 *b*) consists of eighteen teeth, of which the proximal are more or less squarely truncate and almost completely fused—four basal ones excepted, — while the distal are much more free, pointed, and minutely spined along posterior margin. No independent terminal spine placed on a lower level than the teeth of the serrula proper is present, as is the case in *Ideobisium Balzani* and *crassimanum*, Bal. (comp. Hansen, 15, pl. v. fig. 6 *b*), as well as in two undescribed Indian species examined by me—unless the last tooth of the serrula should correspond to it.

The *galea* (fig. 2 *c*) is slender, moderately long, curved, and blunt; a few minute teeth are noticed near the tip. The terminal point of the movable finger is distinctly longer and more curved than that of the other finger; above its terminal hook we find a much shorter and stouter one. The tip of the immovable finger is placed between these two when the hand is closed. Behind the described dorsal tooth a long and broad marginal projection is placed, which on the right antenna has the margin slightly folded (fig. 2 *d*), and on the left (fig. 2 *c*) is broken up into blunt teeth.

The *serrula exterior*, of which a distal third portion is free, consists of about twenty teeth, which are squarely truncate and touching each other in almost their whole length (fig. 2 *c*).

*Maxille* (Pl. X. fig. 1 *a*).—The labrum is well developed and widened out distally. The median triangular portion of the maxillæ, seen from below, appears strongly raised and falls steeply laterally. In front we find, as usual, an interior marginal lyriform organ, consisting of a single semicircular fissure (fig. 1 *a*, *i*), and more behind a median lateral one, consisting of several more or less curved fissures (fig. 1 *a*, *m*). The terminal portion is thinly chitinized, placed on a higher level than the basal region, and is provided with two pointed hairs; at its base a single very long and slender one is situated. Along the terminal portion a narrow *lamina inferior* (?) is placed, and in addition to this a broader and longer *lamina superior*.

*Palps* (Pl. X. figs. 1 *b*–*c*).—The palps seem to be smooth, with the exception of the exterior basal elevation of the femur, which is granular. Longer or shorter, pointed and simple hairs are abundant everywhere. The hand bears

besides a single tactile hair near the inner margin and nearer to the middle than to the base (fig. 1 *b*, 1); the immovable finger possesses on the outer surface three tactile hairs near the base and two more distally (fig. 1 *c*, 4-8); the dorsal surface with two distal hairs (fig. 1 *b-c*, 2-3), and the inner without any. The movable finger has four tactile hairs on the outer surface (fig. 1 *c*). Outside, near the base of the fingers, we find a peculiar organ, shaped like a compressed horseshoe (fig. 1 *c*, *h*) and with a clear spot inside. Four similar ones are found interiorly near the upper margin at the base of the finger, the one placed above the other, each consisting of a low elevation with almost oval outline, and provided with a round clear spot at the top in the middle; each of the spots seems to possess a median dot (comp. 15, p. 201).

The *trochanter*, which is twice as long as broad, is distinctly stalked and gradually widened out distally; the inner side is, with the exception of a low basal concavity, regularly convex from the base to the tip; the outer side is slightly curved inwards. The *femur*, which is 3.5 times longer than broad, is provided with a distinct but short stalk; the interior side is slightly and almost regularly convex from the base to the tip; the outer side has, after the shallow notch which marks off the stalk, a low elevation; beyond this there is first a low concavity and then a moderate convexity. The *tibia*, which is slightly shorter and broader than the femur, is distinctly stalked and gradually enlarged distally; the inner side, beyond the concavity which marks off the stalk and the following low elevation, is slightly convex or, more correctly, shaped as a very open obtuse angle; the outer side is almost straight both before and beyond the scarcely visible elevation of the stalk and at last slightly convex. The *hand*, which is a little shorter than the tibia, but nearly twice as broad as the femur, is higher than broad and shorter than the fingers. The convexities of the superior and especially of the interior surfaces are much more marked than those of the inferior and exterior ones. Both fingers bear obtuse, squarely truncate, densely placed teeth; the tip of the immovable finger is much more hooked than that of the movable one.

*Coxæ* (Pl. X, fig. 1 *a*).—The *coxæ* are all placed on the same level, but on a lower level than the *maxillæ*. The first pair is almost as broad as long and scarcely enlarged towards the extremities; the second pair is of almost equal breadth, but distinctly enlarged distally; the third pair is so much enlarged distally that it becomes almost triangular, but much less marked than the corresponding pair in

*Ideobisium Balzani*. The fourth pair is broader again, enlarged distally, with the posterior corner smoothly rounded like the postero-exterior, which is produced backwards.

*Legs* (Pl. X. figs. 1 *d-f*).—The skin of the legs, especially that of the femora and tibiæ, seems to be minutely shagreened; we find more or less long, pointed, and simple hairs everywhere. An exceedingly long “*tactile*” hair is placed dorsally near the base of first tarsus of the last two pairs of legs. On each side near the base of the claws is placed a rather short hair with some few teeth distally along its upper margin (fig. 1 *f*). The areola is shorter than the slender claws. The legs are long and slender. The basal femoral part of the first pair of legs (fig. 1 *d*) is three times as long as high and twice as long as the distal part. The tibia is slightly shorter than the basal femoral part and a little longer than the second tarsus, which is about 2.5 times longer than the first. The femur of the fourth pair (fig. 1 *e*) is rather slender and three times longer than high; the articular membrane of the rather short trochantin is not straight as usual in *Ideobisium* (cf. p. 134), but oblique as in *Olpium*. The tibia is distinctly longer than tarsus ii., which is more than twice as long as tarsus i., but shorter than both tarsi together. The trochanter of the first pair of legs is enlarged distally and only a little longer than high; that of the fourth pair is much more slender and almost twice longer than high.

*Colour*.—The palps and maxillæ are yellowish brown with darker fingers; the cephalothorax is brown; the abdominal tergites are lighter with yellowish interarticular membrane; white spots, placed under the skin, are seen everywhere. The coxæ are brownish and the legs yellowish, both with a greenish shade.

*Measurements*.—Cephalothorax 0.720 (0.588); abdomen 1.820 (1.036) mm.

Palps: trochanter 0.392 (0.196); femur 0.784 (0.214); tibia 0.728 (0.245); hand 0.700 (0.388), height 0.420; finger 0.800 mm.

Leg i.: femur i. 0.396 (0.105); femur ii. 0.198 (0.100); tibia 0.315 (0.081); tarsus i. 0.125, tarsus ii. 0.305 mm.

Leg iv.: femur 0.675 (0.225), trochantin 0.235; tibia 0.495 (0.108); tarsus i. 0.162, tarsus ii. 0.360 mm.

*Material*.—Mr. H. H. Smith collected a single female near Chandilly (Windward Islands) at a height of 800 feet, March 14th, in fermenting cocoa-husks (shady place).

*Remarks*.—I have referred the above-described species to

*Id. mexicanus*, Bks. : the minor points in which this species differs from Banks's description seem not to be sufficient for establishing a new species ; but, on the other hand, we must admit that the description mentioned is too insufficient and lacking in important details for settling the question definitely.

The differences are the following :—The cephalothorax is only 1·2, not 1·5, longer than broad ; the trochanter of the palps can scarcely be called swollen behind ; the tibia is almost as long as the femur, not one fourth shorter ; the tibia can scarcely be called "short pedicellate" and is slightly broader than femur, not merely as broad.

This species is most easily distinguished from *Ideoroncus pallidus*, Balz. (10, p. 444), as well as from two undescribed species from Siam, which I have examined, by the flagellum, which consists of three short hairs, but especially by the tactile hairs of the hand ; *Id. mexicanus* bears only a single dorsal one, while the others bear four, placed in a trapezoid. On account of its slender palps and the arrangement of tactile hairs, it presents no similarity to *Id. gracilis*, Balz. (11, p. 540). From *Id. obscurus*, Bks. (12, p. 66), it differs by the simple undivided galea, by the palps, which are longer than the body, femur of the palps longer than the cephalothorax, and fingers distinctly longer than hand.

*Ideobisium Balzani*, sp. n. (Pl. X. figs. 2 a-h.)

♂. *Cephalothorax* (fig. 2 a).—The comparatively large eyes are placed near to each other at the lateral margin, removed from the front margin a distance about as long as their diameter (fig. 2 a). The cephalothorax, which is a little longer than broad posteriorly, has almost parallel sides, and is of nearly equal breadth behind the eyes, but slightly narrower in front of them. The front margin passes into a rather broad, rounded, median "epistoma." There are no transverse grooves. The skin seems to be smooth, and is provided with moderately long, slender, and pointed hairs everywhere.

*Abdomen*.—The abdomen is distinctly longer than broad and broadest in the middle. The sclerites of the tergites are, with the exception of the eleventh, of almost equal breadth and length (the second and third are a little shorter), and well separated from each other by long thin-skinned membranes. The sclerites seem to be smooth and bear some few simple pointed hairs along the hinder margin ; those in the middle are rather short, but the more lateral

ones are long and slender. The tenth and eleventh tergites bear a pair of "tactile" hairs each. The sides of the abdomen are minutely shagreened. The fifth to the eleventh sternal sclerites are similar to the tergal, but they are rather short in the middle and widened out laterally; the hairs, which are long and slender, are not placed along the hinder margin, but behind. The sclerite of the fourth sternite is divided into two well-separated triangular portions. The sclerite of the third sternite is better marked and provided with short hairs along hindmost margin and with the front margin curved inwards in the middle. In front of this sternite, which constitutes the hindmost genital plate, and between the fourth pair of coxæ, a complicated system of inner organs belonging to the male system are visible.

*Antennæ* (figs. 2 *a-b*).—The antennæ are large and gape distinctly when closed. The *flagellum* consists of at least six long slender hairs, provided with densely placed tiny teeth along the front margin; the hindmost hair is considerably shorter than the others. This flagellum presents great similarity to that of *I. crassimanum*, Balz. (cf. H. J. Hansen's figure, 15, tab. v. fig. 6 *f*). The immovable finger possesses along its inner margin a dorsal row of many tiny teeth, which vary in number and size in the different specimens.

The *serrula interior* is very similar to that described by Hansen in *Id. crassimanum*, Bal. (fig. 6 *b*); the basal teeth are placed near to each other and are very short compared with the distal ones, which are almost completely free, slightly curved, pointed, and with the hinder margin serrated; this serrula seems to be fused with the finger in its whole length to base of terminal tooth. Independent of this serrula, and placed on a lower level, there is a very long, slender, and curved spine, slightly dentated along its hinder margin; we find a similar one in *I. crassimanum*, but less curved.

The *galea* is rather long, slender, and blunt; its root is well removed from the tip of the finger. The end of the movable finger is moderately curved (fig. 2 *a*); behind the tip the dorsal margin possesses six to ten teeth, which are of unequal size in the different specimens, and even in the two antennæ of the same specimen.

The *serrula exterior* is very similar to that drawn by Hansen for *I. crassimanum* (fig. 7); its distal portion is free; there are about 30 teeth, which are larger distally and are more or less fused. When the serrula is observed

from the edge (fig. 2 *b, s*), it will be seen that the proximal portion is directed more downwards, the distal more upwards. If we examine the antennæ in their natural position, we will see the immovable from the edge with the serrula interior directed downwards and outwards, working against the serrula exterior (fig. 2 *a*).

*Maxillæ* (fig. 2 *c*).—The maxillæ, the hindmost portion of which is covered by the first pair of coxæ, appear more trapezoid than triangular; the terminal portion is moderately pointed, only this bears a long slender hair at the base and several shorter ones distally; a distinct long lamina maxillaris is present.

*Palps* (figs. 2 *d-e*).—The palps seem to be smooth with the exception of the inner surface of the hand. More or less long and slender hairs are found everywhere; those of the inner side are the longer; the inner surface of the hand bears two very long hairs; the hairs of the fingers are placed more densely. The hand bears exteriorly three tactile hairs (fig. 2 *e*, 6-8), one more forwards and two a little more backwards, the one above the other. The immovable finger possesses on the outer surface two tactile hairs (figs. 2 *e*, 4-5), and on the dorsal surface three (fig. 2 *d*, 1-3). The movable finger has one tactile hair at the base and three, one above the other, in the middle (fig. 2 *e*).

The *trochanter* is distinctly stalked and longer than broad; the inner side is marked off from the stalk by a moderate convexity, and is beyond almost straight to the end; the outer side is extremely short and concave. The *femur*, which is 2.5 times longer than broad, has a very short stalk; the inner surface has first a moderate convexity and thereafter a slightly pronounced concavity; the exterior side is first provided with a short and low elevation just beyond the stalk, and is then almost straight. The *tibia*, which is slightly shorter and broader than the femur, is distinctly and shortly stalked; the inner outline is almost semicircular beyond the deep notch which marks off the stalk; the exterior side is proximally almost straight, but for a very low elevation near the base, and distally very strongly convex. The *hand*, which is as long as femur and 1.8 times broader, is almost 1.5 times longer than broad and as high as broad; it is only a trifle longer than fingers, which are distinctly longer than the hand is broad. Both interior and exterior surfaces are much more strongly convex than the superior and inferior. The marginal teeth of the fingers are placed near to each other and squarely truncated.



*Coxæ* (fig. 2 *c*).—The coxæ are not placed completely on the same level; the first pair covers the hindmost portion of the maxillæ. The first pair is almost as broad as long; the second pair is a little longer and slightly enlarged distally; the third pair, the front margin of which is covered by the second, is widened out distally so considerably that its shape becomes almost triangular. The fourth is as broad as the third is distally and is almost trapezoid; the postero-interior corner is obtuse, and the postero-exterior is rounded but scarcely produced backwards as in *Ideoroncus mexicanus*, Bks. (Pl. X. fig. 1 *a*).

*Legs* (figs. 2 *f-h*).—The skin of the legs seems to be smooth. We find more or less long, pointed, and simple hairs everywhere; a dorsal "tactile" one is placed near the base of the first tarsus of the fourth pair of legs. A long pointed hair, which is provided with many teeth, especially downwards, on each side near base of the claws (fig. 2 *h*). The claws are strongly curved and longer than the areola. The legs are less long and slender than in *I. mexicanus*; the basal femoral part of the first pair of legs (fig. 1 *f*) is three times longer than high and 1.4 as long as the distal part. The tibia is as long as the basal femoral part, distinctly longer than the second tarsus, and only a little shorter than the two tarsi together; the distal portion of the tarsi is twice as long as the basal. The femur of the fourth pair (fig. 2 *g*) is about twice as high as long; the trochantin is almost half as long as the whole femur, with straight articular membrane. The tibia is a little longer than the two tarsi, of which the distal is almost twice as long as the basal.

*Colour*.—The hand and the tibia of the palps are reddish brown; the basal joints, maxillæ, and coxæ are darker or paler yellowish brown; the legs are very pale. The cephalothorax is brownish; the abdominal sclerites are lighter and more brilliant. Some of the specimens are paler, while others are darker.

*Measurements*. — Comparatively small specimen from St. Vincent. Cephalothorax 0.513 (0.450); abdomen 0.990 (0.540) mm.

Palps: trochanter 0.224 (0.144); femur 0.425 (0.162); tibia 0.378 (0.207); hand 0.410 (0.288), height 0.288; finger 0.360 mm.

Leg i.: femur i. 0.207 (0.099); femur ii. 0.152 (0.099); tibia 0.207 (0.063); tarsus i. 0.090; tarsus ii. 0.170 mm.

Leg iv.: femur 0.468 (0.207); trochantin 0.225; tibia 0.360 (0.095); tarsus i. 0.126; tarsus ii. 0.225 mm.

♀.—A much darker specimen from Upper Richmond Valley is probably a female; as the following dimensions make evident, neither the absolute nor the relative proportions are quite alike; but in all other respects it seems to be similar to the above-described male, which is perhaps a young one.

Cephalothorax 0·588 (0·532); abdomen 1·260 (0·700) mm.

Palps: trochantin 0·280 (0·168); femur 0·564 (0·210); tibia 0·476 (0·252); hand 0·560 (0·392); finger 0·448 mm.

*Material, &c.*—This species seems to be very common in the West Indies. I have examined specimens from several localities at St. Vincent, collected partly by Mons. E. Simon and partly by Mr. H. H. Smith; the latter seems to have taken most of his specimens under rubbish or rotten leaves in mountainous forests (1200–3000 feet) during the months from January to March.

*Remarks.*—This species seems to be nearly related to *Id. crassimanum*, Bal. (II, p. 542), from which it differs in the following characters:—The abdominal sclerites seem to be smooth, not granular; the epistoma is rounded, not subconical; the immovable finger of the palp has three, not two, tactile hairs; the hand is not 1·7 times longer and not 1·3 times broader than fingers are long, but longer than hand is broad.

## II.—COXAL SAC. (Pl. VII. figs. 4 *b-f*.)

If we carefully examine the fourth pair of coxæ in the male of *Chelififer socotrensis*, sp. n., we shall find a remarkable organ which I propose to call the coxal sac. This organ is only slightly developed in this species compared with many others more or less nearly related to *Ch. canceroides*, L., for instance, *Ch. sculpturatus*, Lewis (p. 121); in this paper I shall give only the description of its structure in *Ch. socotrensis*. My investigations on its modifications and fuller development in other forms I hope to get finished in a not too distant future. The coxal sac is situated in the inner and hinder part of the coxæ, and directed towards the postero-interior corner (Pl. VII. fig. 4 *b*), where probably an opening is found through which the hairs of the funnel are directed. The sac, which is rounded and elongated, consists of two portions which are well marked off from each other dorsally and laterally. I was not able to settle the question whether the sides which I have called dorsal and ventral really are so or not. I use these terms because the position of this organ in one of the specimens I examined seems to

bear out this opinion. The two parts into which the coxal sac is divided are of very unequal size; the basal, which is nearest to the postero-interior corner, is only half as spacious as the distal part. The two portions are dorsally and laterally separated from each other by a rather deep groove as well as a chitinous ring (figs. 4 *e-f*), but ventrally there is no such distinction (figs. 4 *c-e*). Not only the outer surfaces, but also the inner cavities, are well marked off from each other except ventrally. Just between the two portions, and, as it seems, fastened to the above-mentioned ring, we find a "funnel" of hairs, which is open below (figs. 4 *e-f*, *b-f*). There is consequently no direct communication between the two cavities except ventrally. The units which build up the funnel are of two kinds; its wider basal portion is more solid and seems to have been formed by the fusing of elongated tubercles like those with which the inner walls of the distal sac are beset. These tubercles are not in every case all fastened behind to the above-mentioned ring, because at least some are seen to be free posteriorly and project into the distal cavity (fig. 4 *e*). The more narrow distal part of this funnel is composed of a number of long, slender, and pointed hairs which converge towards each other and are directed through the round entrance-opening (*o*) of the sac (*t*). This entrance opening, which is found just at the end of the organ, is, at least in other species, connected with an opening in the ventral wall of the coxæ, and the above-mentioned hairs project through this opening. The dorsal and partly the lateral walls of the distal cavities are provided with subconical tubercles which project into the lumen (figs. 4 *e-f*, *h*); each tubercle bears at least one terminal pointed hair. These tubercles are sometimes supported by chitinous ridges. The skin of the coxal sac is everywhere minutely granular.

### III.—ABNORMAL SEGMENTATION.

#### *Chelifer sculpturatus*, Lewis. (Pl. VIII. fig. 2 *a*.)

One of the dried females of this species which I examined showed some abnormalities in the segmentation. The first abdominal tergite is normal (Pl. VIII. fig. 2 *a*); all the following are, as usual, divided into a right and a left portion by a longitudinal line. The left portions of the second and third tergites are well separated laterally, but fused in the middle, because the groove between them has been gradually abolished. The depressed areas and the ridges between show

also some irregularities. The other half part (the right) of the second tergite is rather short, but otherwise of usual shape; it is separated in its whole length from the right portion of the third segment, which is distinctly widened out towards the middle. If we regard the two segments as a whole, it will easily be seen by looking at the figure that the two half parts are of almost equal length laterally, but that the right half is distinctly longer than the left in the middle. The longitudinal line between the two is not parallel to the longitudinal axis of the body, but forms an acute angle with it. The left portion of the fourth tergite is rather long and well separated from both the third and fifth, especially towards the middle, where it becomes narrower. The right half is exceedingly narrow and rather short; the space between the two portions is very well marked, being twice as broad as the right half and more than half as broad as the left half. The wide open area thus formed is limited behind by the convex margin of the right half of the otherwise regular fourth tergite; it is like an attempt at lessening the unprotected wide space. The ventral side shows no trace of these irregularities.

*Chelifera javanus*, Thor., ♂. (Pl. VIII. fig. 1 a.)

As I looked over the collections of *Chelonethi* from India I discovered a specimen (♂ from Tharravadi, Burma) which was remarkable for its abnormal segmentation. The first and second abdominal tergites are normal, but the two following show a peculiar structure. The left half of the third tergite is fused with the right half of the fourth. I have not been able to distinguish the longitudinal line which elsewhere divides the sclerites, and it is consequently impossible to tell where the one begins and the other ends. The right half of the sclerite thus formed is much longer and somewhat narrower than the left. The right half of the third tergite is without connexion with the corresponding left half; its sclerite is triangular and rather short. The left portion of the fourth tergite passes into the right, but its sclerite has no connexion with the sclerite of the right side. The positions of the hairs are as usual, and, as seen in the figure, not the same in the third and the fourth tergites. The right side of the latter shows some irregularities, as the hindmost row of hairs are placed behind the hinder margin of the sclerite. The ventral side shows no trace of the described abnormalities.

In the following I enumerate a few similar cases of

abnormal segmentation found in Arachnids, Insects, and Annelids :—

*Arachnids.*—In Hansen and Sørensen's paper (24, p. 97, pl. ii. fig. 2 a) I came across a figure of *Stylocellus sumatranus*, Westw., one of the Cyphophthalmi, which shows that the groove between the fifth and the sixth tergite on the left side is incomplete; a kind of split segment is thus formed. If the right half of the sixth tergite is fused with and undistinguishable from the right part of the fifth the abnormality is of another nature than that found in *Ch. javanus*; but if it is connected with the right half of the seventh tergite the similarity to the above-described case is unmistakable.

*Insects.*—In the collections of the British Museum I found some specimens of Hymenoptera showing abnormalities in the segmentation. By the kind assistance of Col. Bingham I am able to give the names of the insects in question. In Trans. Ent. Soc. (23) I found a short note about one of these animals by the Rev. F. D. Morice, who had collected the specimens. He exhibited to the Society a specimen of "*Gorytes quinquecinctus (fossor)* with the abdominal segments twisted out of their proper shape and place." The animal so named is, according to Col. Bingham, not a *Gorytes*, but *Cerceris quinquefasciata*. The cases are the following :—

1. *Polistes* sp.—The first and the second segments are normal, the latter being provided with the usual yellow spots and marginal band, but the two following tergites are irregular. The left side of the third passes without any limitation whatever into the right side of the fourth, and so does the yellow band along the hindmost margin, which is directed obliquely backwards. The right portion of the third tergite, which is bordered with yellow, is well separated from the left and is short and narrow. The left portion of the fourth is even less marked, almost triangular, bordered with yellow, and without communication with its right part or with the fifth tergite. The latter is almost normal if the irregularly shaped anterior and posterior margins be excepted. Ventrally and laterally the segmentation appears normal.

2. *Megachile* sp.—The dorsal side shows the following abnormalities :—The hindmost margin of the third segment is not quite transverse, but slightly oblique, so that its right side becomes longer than its left. The left halves of the fourth and the fifth segments, which are well separated by a

groove bordered with thin yellow hairs, are both fused with the right half of the fourth tergite, which is rather short, especially laterally. The right half of the fifth tergite is consequently without connexion with its corresponding half; it is short, almost triangular, and bears the usual marginal row of yellow hairs.

3. *Cerceris quinquefasciata*.—The segmentation shows dorsally very remarkable variation. The first segment is normal; the left half of the second tergite, which bears a moderately large yellow spot, merges into the right half of the third, being rather short and almost yellow, on account of its prominent spot. The right portion of the second segment, which is very small and with a tiny yellow spot, is well limited from the tergite thus established. The left half of the third tergite, which is almost yellow, is well separated by a groove from the left part of the fourth, but passes into its right half without any limitation. The fourth segment, together with the one half of the third, becomes thus a split segment (*cf.* Morgan, 19, p. 245).

Many cases of a similar kind of abnormality or variation in the segmentation have been described in different forms of Annelids (compare the literature, 18–21). In outer appearance many of these abnormalities (Cori, 18, Taf. xxv. figs. 5 *a*, *b*) are very like those described here, especially in *Megachile* (segments iv. and v.) and *Cerceris* (segments iii. and iv.), and also in *Chelifer javanus*, Thor. (Pl. VIII. fig. 1 *a*). Cori (18, p. 576) characterizes the abnormality in the following manner:—“Dass die äusseren Segmentgrenzen der betreffenden Körperabschnitte nicht die Form von Kreistouren haben, sondern Schraubenlinien beschreiben.” It has also been called “spiral segmentation” (Bateson, 21).

Even if there is great similarity between the more simple cases of “spiral segmentation” in the Annelids and the abnormalities found in the segmentation of the above-described Articulata, it remains to be proved that the similarity is more than superficial. The number of the segments is not so constant in the Annelids as in most Arthropods, and the individuality of each segment, especially in the inner structure, is more pronounced in the former than in the latter group. The distinction between dorsal, ventral, and lateral parts within each sternite is better marked in the Arthropods. All these are reasons to be careful in comparing and identifying similar phenomena of this kind in the two groups. Different authors have tried to explain the

spiral segmentation, but in different ways. In the Arthropods there are at least two modifications, viz.: "the split segment," in which the one half of a segment is fused with its fellow half as well as with that of another segment; and the modification in which the one half of one segment is fused with the opposite half of the following, without having any connexion with its own corresponding half. Both modifications are found in *Cerceris* and an intermediate link in *Chelifer javanus* (Pl. VIII. fig. 1 a). The abnormality of *Ch. sculpturatus* (Pl. VIII. fig. 2 a) seems to be somewhat different. Whether the abnormalities mentioned are due to injuries in the embryos or later on in life or to quite different causes cannot be decided until a larger number of forms, especially of Myriopods, have been examined.

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## EXPLANATION OF THE PLATES.

### PLATE VI.

#### *Chelifer bifissus*, Sim., ♀.

Fig. 1 a. Left galea, × 335.

Fig. 1 b. Left palp, × 37.

Fig. 1 c. Left leg i., × 65.

Fig. 1 d. Left leg iv., × 65. *t*, "tactile" hair.

Fig. 1 e. Tip of left tarsus i., × 335.

Fig. 1 f. Tip of left tarsus iv., × 335.

#### *Chelifer australiensis*, sp. n.

Fig. 2 a. Ventral view of cephalothorax, × 24. *a*, anterior genital plate; *p*, posterior.



*Fig. 2 b.* Flagellum of left antenna,  $\times 217$ .

*Fig. 2 c.* Left antenna,  $\times 139$ .

*Fig. 2 d.* Left palp,  $\times 15$ .

*Fig. 2 e.* Hand of right palp,  $\times 23$ .

*Fig. 2 f.* Left leg i.,  $\times 18$ .

*Fig. 2 g.* Left leg iv.,  $\times 18$ .

*Chelifer hawaiiensis*, Sim.

*Fig. 3 a.* Hand of right palp,  $\times 59$ . *a*, accessory teeth; *s*, sense-organs.

PLATE VII.

*Chelifer hawaiiensis*, Sim., ♀.

*Fig. 1 a.* Left palp,  $\times 20$ .

*Fig. 1 b.* Left leg i.,  $\times 31$ .

*Fig. 1 c.* Left leg iv.,  $\times 31$ .

*Fig. 1 d.* Lateral tarsal hair of left tarsus (anterior),  $\times 205$ .

*Fig. 1 e.* Lateral tarsal hair of left tarsus (posterior),  $\times 205$ . (Variation.)

*Fig. 1 f.* Left antenna,  $\times 190$ . (Variation.)

*Chelifer pacificus*, sp. n., ♀.

*Fig. 2 a.* Left palp,  $\times 20$ .

*Chelifer pallipes*, White.

*Fig. 3 a.* Right palp,  $\times 22$ .

*Fig. 3 b.* Hand,  $\times 21$ .

*Chelifer socotrensis*, sp. n.

*Fig. 4 a.* Left palp, ♂,  $\times 12$ .

*Fig. 4 b.* Right coxæ iii.-iv.,  $\times 50$ . *c*, coxal sac.

*Fig. 4 c.* Left coxal sac, almost seen from the basal end,  $\times$  about 300. *f*, funnel of hair; *b*, base of funnel.

*Fig. 4 d.* Left coxal sac in almost ventral view,  $\times$  about 300. *f*, as in 4 c; *o*, basal opening; *h*, tubercles with hairs.

*Fig. 4 e.* Left coxal sac in almost posterior view. Letters as in 4 c-d; *t*, free hairs of funnel.

*Fig. 4 f.* Left coxal sac, almost in dorsal view,  $\times$  about 300. Letters as in previous figures.

*Fig. 4 g.* Tarsus i. of left leg, ♂,  $\times 62$ . *li.*, lateral hair, inner; *le.*, outer.

*Fig. 4 h.* Tarsus i. of left leg, ♀,  $\times 62$ . Letters as in 4 g.

PLATE VIII.

*Chelifer javanus*, Thor., ♂.

*Fig. 1 a.* Abdominal tergites i.-v.,  $\times 30$ . i-v, number of segments.

*Chelifer sculpturatus*, Lew.

*Fig. 2 a.* ♀ in dorsal view, showing the abnormal segmentation,  $\times 17$ . i-v, corresponding abdominal segments.

*Fig. 2 b.* ♂. Coxæ iv. and genital area,  $\times 30$ . *c*, opening of coxal sac; *a*, anterior plate; *s*, stigma i. within a concavity of posterior plate; *g*, line dividing off hinder part of posterior plate; *iv*, sternite iv.

*Fig. 2 c.* ♂. Right palp,  $\times 16$ .

*Fig. 2 d.* ♀. Right palp,  $\times 16$ .

*Fig. 2 e.* From cast skin, right palp,  $\times 55$ . *s*, sense-organs; *t*, tactile hairs.

*Fig. 2 f* ♀. Left coxæ iii.-iv.,  $\times 30$ .

*Fig. 2 g.* Claw with lateral hair,  $\times 145$ .

*Fig. 2 h.* Cobweb of cocoon,  $\times 550$ .

*Chelifer equester*, sp. n.

*Fig. 3 a* ♀. Flagellum of left antenna,  $\times 151$ .

*Fig. 3 b* ♀. Tip of immovable finger of left antenna in ventral view,  $\times 151$ . *l*, lamina exterior; *t*, terminal spine; *s*, five dentated lobes of the lamina interior.

*Fig. 3 c* ♀. Left galea,  $\times 115$ .

*Fig. 3 c* ♂. Left movable finger of antenna,  $\times 100$ .

*Fig. 3 d* ♀. Coxæ iii.-iv.,  $\times 34$ .

*Fig. 3 d* ♂. Coxæ iii.-iv. with genital area,  $\times 34$ .

PLATE IX.

*Chelifer equester*, sp. n.

*Fig. 1 a* ♂. Left palp,  $\times 10$ .

*Fig. 1 a* ♀. Left palp,  $\times 10$ .

*Fig. 1 b* ♂. Femur of right palp,  $\times 15$ .

*Fig. 1 b* ♀. Femur of right palp,  $\times 15$ .

*Fig. 1 c* ♂. Tibia of right palp,  $\times 18$ .

*Fig. 1 c* ♀. Tibia of right palp,  $\times 18$ .

*Fig. 1 d* ♂. Hand of right palp,  $\times 10$ .

*Fig. 1 d* ♀. Hand of right palp,  $\times 10$ .

*Fig. 1 e* ♂. Left leg i.,  $\times 18$ .

*Fig. 1 f* ♂. Left leg ii.,  $\times 18$ .

*Ideoroncus mexicanus*, Bks., ♀.

*Fig. 2 a.* Front part of cephalothorax,  $\times 91$ .

*Fig. 2 b.* Serrula interior and flagellum of left antenna,  $\times 249$ .

*Fig. 2 c.* Serrula exterior and galea of left antenna,  $\times 249$ .

*Fig. 2 d.* Right antenna in dorsal view,  $\times 125$ .

PLATE X.

*Ideoroncus mexicanus*, Bks.

*Fig. 1 a.* Cephalothorax in ventral view,  $\times 50$ . *i*, interior marginal fissure; *m*, median exterior lyrifiform organ.

*Fig. 1 b.* Left palp,  $\times 30$ . 1-8, tactile hairs of hand and immovable finger.

*Fig. 1 c.* Hand of right palp,  $\times 35$ . Numerals as in 1 *b*.

*Fig. 1 d.* Left leg i.,  $\times 50$ .

*Fig. 1 e.* Left leg iv.,  $\times 50$ .

*Fig. 1 f.* Inner lateral hair of left tarsus iv.

*Ideobisium Balzanii*, sp. n., ♂.

*Fig. 2 a* ♂. Antenna and eyes in dorsal view,  $\times 130$ .

*Fig. 2 b* ♀. Left immovable finger,  $\times 216$ . *s*, serrula, seen from edge.

*Fig. 2 c* ♂. Cephalothorax in ventral view,  $\times 52$ .

*Fig. 2 d* ♂. Left palp,  $\times 37$ . 1-8, tactile hairs.

*Fig. 2 e* ♂. Right hand,  $\times 37$ . 4-8, tactile hairs.

*Fig. 2 f* ♂. Left leg i.,  $\times 65$ .

*Fig. 2 g* ♂. Left leg iv.,  $\times 65$ . *t*, tarsal "tactile" hair.

*Fig. 2 h* ♂. Inner lateral hair of left tarsus iv.

## BIBLIOGRAPHICAL NOTICES.

*Birds by Land and Sea.* By JOHN MACLAIR BORASTON.  
London: John Lane, 1905.

"HEAVENS! *Another* bird-book!" was the first exclamation which escaped us on unpacking this volume. But a glance at the beautiful illustrations which are copiously distributed throughout its pages soon convinced us that the book had at least one redeeming feature. Later, when we came to play the critic, we discovered that this was a work of real excellence, a perfectly charming series of essays, one for each month of the year.

The author seems to have written out of sheer love of his subject, rather than with a view of writing a book which, perchance, might "sell." His enthusiasm is infectious!

Possessing an unusual facility of expression the author is able to make even the most everyday fact of his subject interesting. Keen insight and power of interpretation are everywhere apparent in these essays, while here and there he is able to show his less fortunate brother naturalists something of the mysteries of the inner life of birds which are but rarely to be encountered. His observations, for example, respecting the migration of the starlings and his notes on their "pairing flights" are new to us.

The author's comments on the evils unfortunately inflicted on our native avifauna by the game-preservation are peculiarly to the point and have our most cordial sympathy. Never has the case been stated more clearly or more forcibly. He also inflicts a well-merited castigation on a certain Field "Naturalists'" (!) Club, whose conduct at Puffin Island ill-agreed with their title to the claim of "Naturalists."

Valuable hints on the methods of one of the most difficult branches of photography—the photography of living birds—are dropped incidentally by the author, and for these many who read this book will be grateful.

Books by what we may call camera-naturalists are legion, but this is one of the very best that has yet appeared.

W. P. PYCRAFT.

*Our Country's Animals, and how to know them.* By W. J. GORDON.  
London: Simpkin, Marshall, & Co. (n. d.).

THIS volume is the last of the series which have appeared under the above title. We suppose it will be useful to some people, and, so far as we have examined it, it appears to be fairly accurate; but we would point out that the metapterygoid has nothing to do with the quadrate bone, the astragalus and calcaneum are not metatarsal

bones, the Microchæridæ do not belong to the Insectivora but to the Lemurs; *Hyrachtherium* was not Tapir-like, and *Ornithostoma* was not a Crocodile.

We note, as in former volumes, too many instances of loose writing, such as "The land Carnivores can be sorted out on their hind toes . . . ."

The long lists of names of fossil species serve to fill out the book, but it is doubtful whether they fulfil any other useful end whatever.

### MISCELLANEOUS.

*The Echinoid Name Discoidea subucula.*

By F. A. BATHER, Brit. Mus. (Nat. Hist.).

A FRIENDLY criticism of the labels attached to specimens of this Cretaceous Echinoid in the Geological Department of the British Museum has caused me to look the matter up. There is nothing very novel in the conclusions to which I have been led; indeed the tangle was almost entirely unravelled by Mr. J. Lambert twelve years ago\*. But there are four reasons for reopening the question: first, Mr. Lambert's views appear to have passed unnoticed by British authors, in spite of the 'Zoological Record'; secondly, his conclusions are vitiated in the eyes of most zoologists by his acceptance of the pre-Linnean and unbinominal writer Klein; thirdly, a further erroneous alteration of the nomenclature recently appeared in a book for which I was largely responsible; and, lastly, after lying *perdu* for just a century, another use of the name *Discoidea* claims attention. It may therefore be well to defend the name at the head of this note.

The name *Discoidea* was invented by Klein† for a genus of his section *Fibula*, he saying in explanation:—"Discoidea appellamus mutuato nomine a figura *Disci* veterum (ff) qui cum vase ligneo  
"(ff) *Lucerna prægrandis &c. cœnarumque reliquiis discus &c.*, Apul. 2, Miles, p. 125."

tornato convexo-concavo, quo nos reliquias ex mensa reponimus. comparari potest. Tischkorb, Tellerschussel." The sole species mentioned under this name was called by him *Discoidea subuculus*.

Several of Klein's names were legitimized in 1778 by Leske in

\* "Recherches sur les Échinides de l'Aptien de Grandpré," Bull. Soc. Géol. France, (3) xx. p. 77 *et seq.*; Nov. 1892. See further, Lambert, "Étude . . . Échinides crétaqués dans l'Yonne," Bull. Soc. Sci. Yonne, xlviii. pp. 58, 59; 1894.

† Nat. Disp. Echinodermatum, p. 26; 1734.

his 'Additamenta ad . . . Klein &c.'; but the name *Discoïdes* was not so endorsed. On the contrary, Leske threw *Conulus* and *Discoïdes*, Klein's two "genera" of *Fibula*, into a single genus, for which he proposed the name *Echinites* \*. The sixth species of this was *Echinites subuculus* Leske ex Klein.

The first writer to resuscitate *Discoïdes* appears to have been James Parkinson, who in vol. iii. of 'Organic Remains' (1811) gave a good account of fossil Echinoids, based upon, but not blindly following, that of Leske. On p. 20 he says, "The second genus of this section is *Discoïdes*, the only species of which is *subuculus*."

Parkinson has been strangely overlooked, and most writers have taken J. E. Gray † as the authority for the genus, and have supposed themselves to be following him in spelling the name "*Discoïdea*." In Gray's paper, however, the spelling is "*Discodea*," which may be a misprint for *Discoïdea*, or, as Mr. Alexander Agassiz has supposed, for *Discoïdes*, since anything is possible in a paper so full of misprints. As type, Gray quoted *Galerites rotularis*, Lamarek's name for *Discoïdes subuculus*. The spelling *Discoïdea* seems to have been first used in 1836 by L. Agassiz ‡, who, under the heading "*Discoïdea macropyga* Agass." (p. 137), wrote:—"M. Gray a judicieusement distingué de nouveau les Galérites à ambulacres étroits, que Klein désignait sous le nom de *Conulus*, et dont le *G. vulgaris* Lam. est le type, de celles dont les aires ambulacraires sont sensiblement plus larges, et que Klein appelait *Discoïdea* [sic], pour en faire un genre dont le *G. rotularis* Lam. est le type." In his systematic summary of slightly later date (p. 186), under "Les Clypéâstres," he placed [Genus] "4. DISCOÏDEA Kl. et Gr. (*Conulus* Leske.—*Echinodiscites* V. Ph.—*Galerites* Lam.)"; then follows the diagnosis and list of species, including "*D. rotularis* Kl. [sic] (*Galerites rotul.* Lam.)." Therefore those who, for good or bad reason, prefer the form "*Discoïdea*," should write "*Discoïdea* Agassiz (emend. *Discodea* Gray, err. typ.)."

But *Discoïdes* Parkinson could be rejected only if the name were preoccupied for some other genus. This proves to be the case. L. Agassiz, in his 'Nomenclator,' under Mollusca, quoted "*Discoïdes*, Ren., = *Pleurobranchus*," giving no reference. Writers on

\* *Op. cit.* p. 171 of original edition, p. 107 of reissue in same year. In Leske's synopsis of his own species and genera, on p. xviii, this is introduced as "Genus III. *Conulus* Klein. *Echinites* mihi." This and the fact that *Echinites* had already been used by Gesner ('Tract. phys. de Petrif.' p. 34; 1758) warrant the adoption of *Conulus*. The genotype is *Conulus*, vel *Echinites*, *albo-galeris* Leske ex Klein; but this is congeneric with *Echinites vulgaris*, the genotype of *Galerites* Lamarek ('Anim. sans Vertèbres,' p. 346; 1801), which therefore is a synonym of *Conulus*. *Echinoconus* A. d'Orbigny ex Breynius, is another synonym.

† "An Attempt to divide the *Echinida* &c.," Ann. Philos. xxvi. p. 429; Dec. 1825. Many writers quote "Gray, 1834," but no such paper can be found; probably they are misled by the words "de nouveau," in the paper by Agassiz quoted below.

‡ Mém. Soc. Neuchâtel, i. pp. 137 & 186.

Mollusca seem to have ignored this, with the exception of Hermannsen †, who has this entry: "*Discoïdes Renieri* (? 1807. Tavol. classif.\* [\*=not seen]) teste Agass. Nom. . . . = *Pleurobranchus* Cuvier."

After much trouble on the part of many friends, I have at last received, through the most kind exertions of Professor Dante Pantanelli of Modena, a clear and almost complete account of the work referred to. The author's name was Stefano Andrea RENIER, of Chioggia. The title of the pamphlet in question is 'Tavola alfabetica | delle conchiglie adriatiche.' The copy in the library of Padua University—the only copy that could be seen—has lost the full titlepage; according to Carus and Engelmann (Bibliogr. Zool. p. 831) it continued "nominata dietro il sistema di Linneo, edizione di Gmelin. s.l. 1788." Professor Pantanelli, however, asserts that the date is indubitably 1804. The date 1807, given by Hermannsen, refers to another pamphlet, No. 1 in Agassiz and Strickland's Bibliography, while the date 1788 may be due to a confusion with No. 5 in that Bibliography. For the present discussion it is enough to admit that any possible date is anterior to 1811.

The book is a folio and comprises two sections: Part I. pp. v-xiii, entitled "Molluschi cioè Lamellibranchi e Gasteropodi compresi quelli terrestri"; Part II. pp. xv-xxvi, "Prospetto delle classe dei vermi ossia Molluschi—Vermi intestinali—Polipi." At the end are eight large systematic tables, preceded by a titlepage. This copy may possibly be incomplete so far as the number of tables is concerned.

The name *Discoïdes* is found only in Part II., and occurs first in line 5 on p. xvi, being the ninth in a list of genera of Mollusca, thus:—

"IX Discoïde    *Discoïdes* Ren.    Discoïde    Discoïde bareolante  
D. natans    D. Branlant Renier."

At the foot of the page are various footnotes; of these (c) gives a description of the genus and (d) an account of the locomotion of the species and of its chief variations. The author promises a more complete description of the species, with anatomical details and a figure, in a future "Saggio"; but this he never published. The descriptions here given are, however, enough to justify the name *Discoïdes*. Whether that name is a synonym of *Pleurobranchus*, established by Cuvier about the same time, must be left to the malacologists to determine.

The Echinoid genus therefore cannot bear the name *Discoïdes* Parkinson 1811, but must accept the modification *Discoïdea*. The American school of purists would enforce the validity of Gray's misprint, while a contrary school would reject both *Discoïdea* and *Discoïlea* because of their common etymology with *Discoïdes*. The latter view, which I do not admit, might lead to the acceptance of one of the names next to be considered.

Gradually other species were described as belonging to the genus,

† *Indicis generum malacoz. &c.*, i. p. 394; 1846.

and in 1883 Pomel, perhaps following a suggestion by Desor\*, thought it necessary to separate these from the true *Discoidea* (*D. subuculus*) as a subgenus *Pithodia*, of which, if it were accepted, the type would be *D. cylindrica* †.

Ignoring this action by Pomel, P. Martin Duncan, on p. 139 of his "Revision of the Echinoidea" ‡, proposed a similar subdivision of the genus on very similar grounds, and erected a subgenus *Echinites*, of which the unique representative was *D. subuculus*. The name, as we have seen, was doubly preoccupied, indeed trebly, for Müller and Troschel had also used it for an Asteroid. The subdivision had been anticipated by Pomel. And Duncan's method of subdivision was impossible, since *D. subuculus* is the genotype of *Discoidea*.

Prof. J. W. Gregory, however, while properly rejecting the name *Echinites*, has gone further, and not merely proposed a new name, *Protocyamus*, "to indicate the affinity of this Echinoid with the *Echinocyamus* series," but has raised the form to the dignity of a genus §.

The name *Protocyamus* cannot stand, and it is very doubtful whether any subdivision is required. Gregory made no attempt to rebut the arguments of Lambert, who (*op. cit.* 1892) pointed out that the chief diagnostic character used by both Pomel and Duncan, namely the distribution of the hydropores on the genital plates, was one that, in some genera at any rate, varied among individuals of a single species.

So far, then, the conclusion is that all the species should be left in one genus under the name *Discoidea* Agassiz.

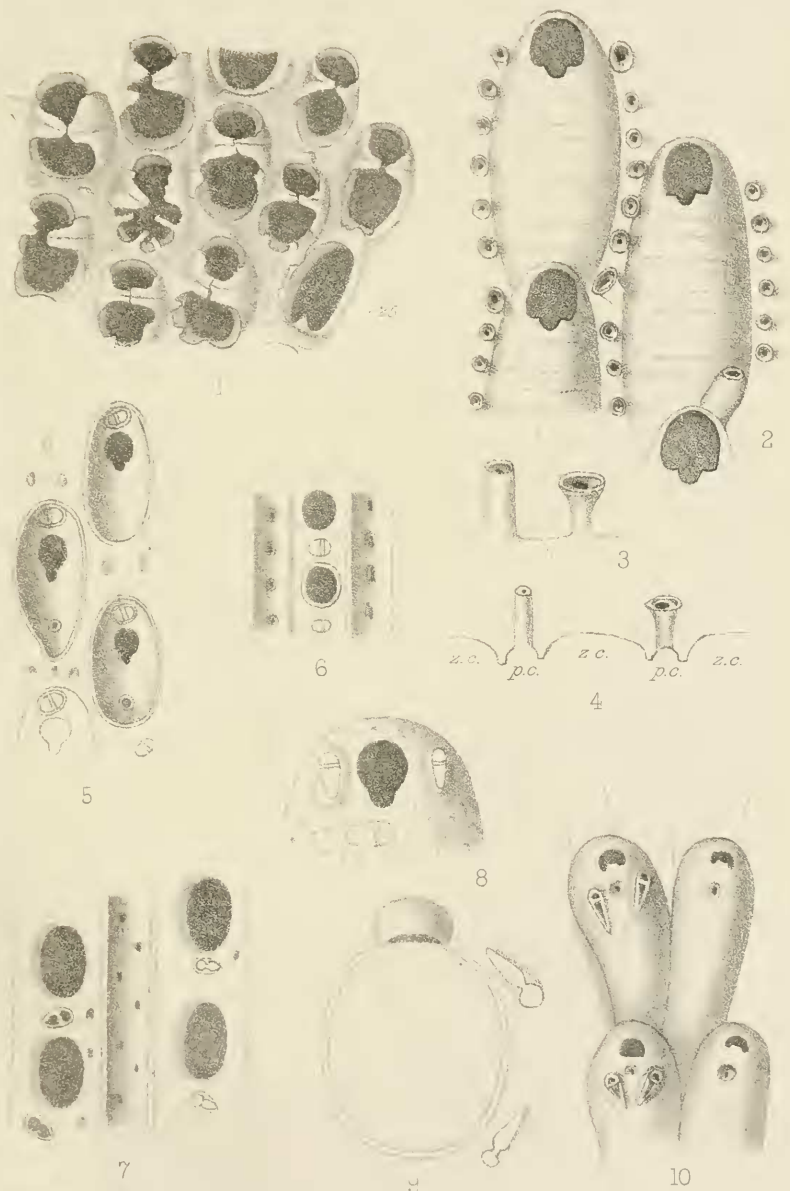
As for the trivial name *subuculus*, the question has been raised whether it should not be *subucula*. Klein, Leske, and, indeed, most authors have written *subuculus*. Klein explains this as "Kamisol-Knopff" (Anglice "shirt-button"), which, however, is not a translation of *subuculus*, but includes the word *Fibula* understood, since the *Conulus* and *Discoidea* of Klein are divisions of his "Sectio I. *Fibula*," which he explains as a *Sphærule vel glomerula vestiaria*. *Subuculus*, then, was Klein's Latin for *Kamisol*; but the Latin word used by Horace and many other authors (see Facciolati and Forcellini's Lexicon) was *subucula*, signifying "a man's shirt," masculine enough in meaning if not in form. If no other authority for *subuculus* can be found, it seems preferable to employ in the Exhibition Galleries of the British Museum the spelling *Discoidea subucula*.

\* 'Synopsis des Échinides,' p. 175; 1858.

† Pomel, "Classification méthodique &c.," Doctoral Thesis, Fac. Sci. Paris, Alger, p. 75.

‡ Journ. Linn. Soc., Zool. xxiii.; 31 Dec., 1889.

§ 'Treatise on Zoology,' ed. Lankester, vol. iii. "Echinoderm," p. 316; 1900.



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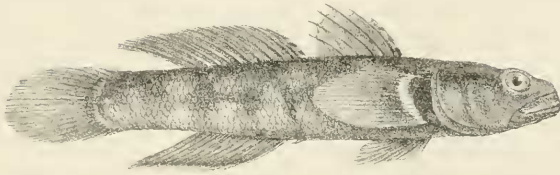
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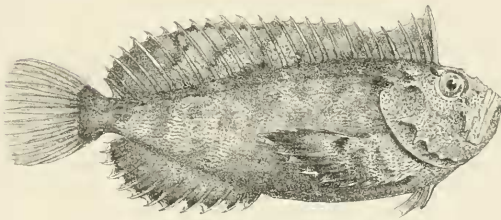




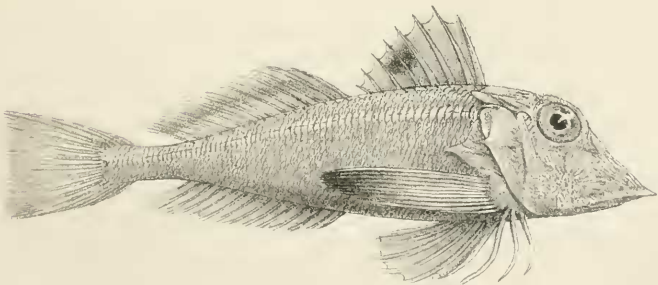
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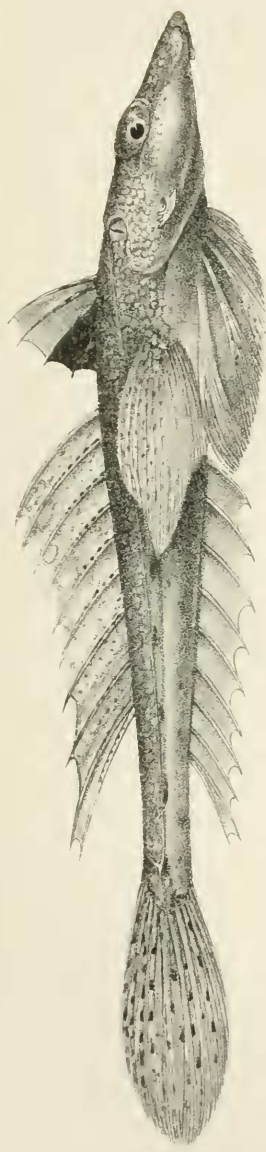


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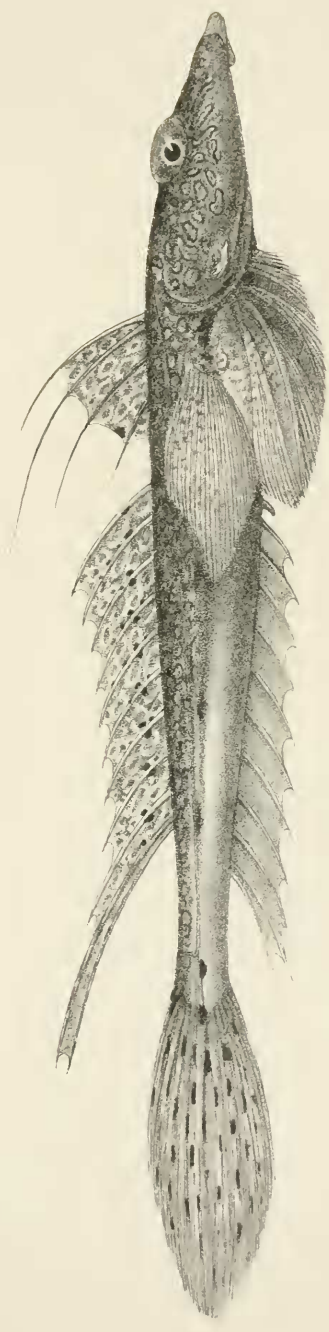


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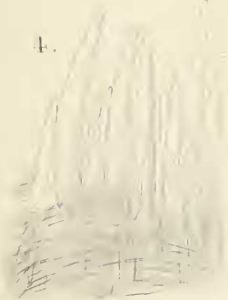
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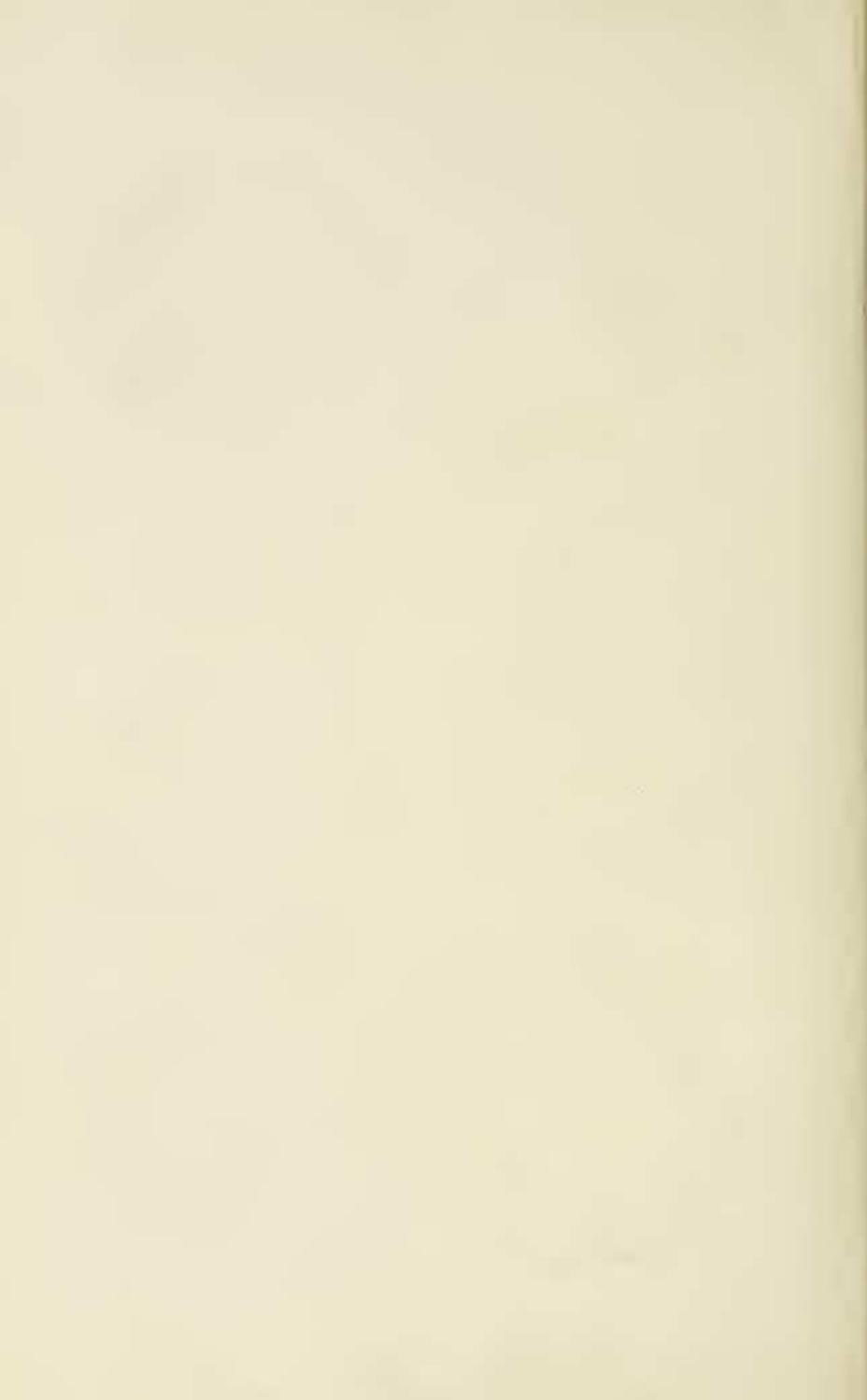


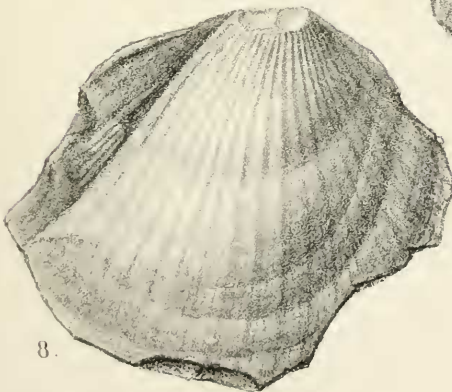
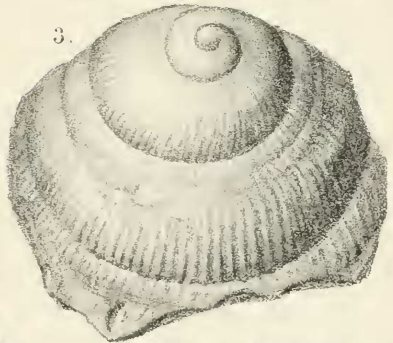
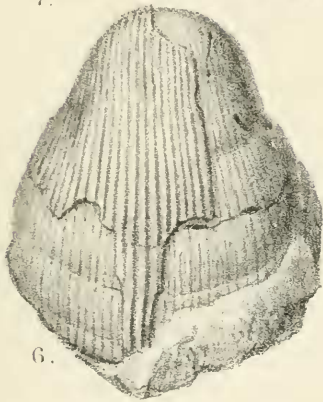
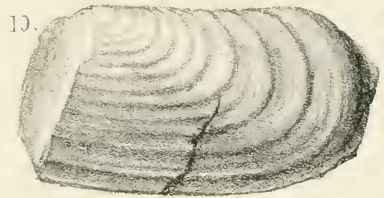
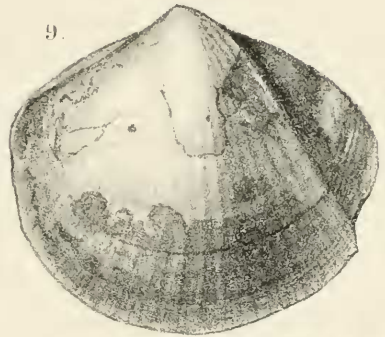
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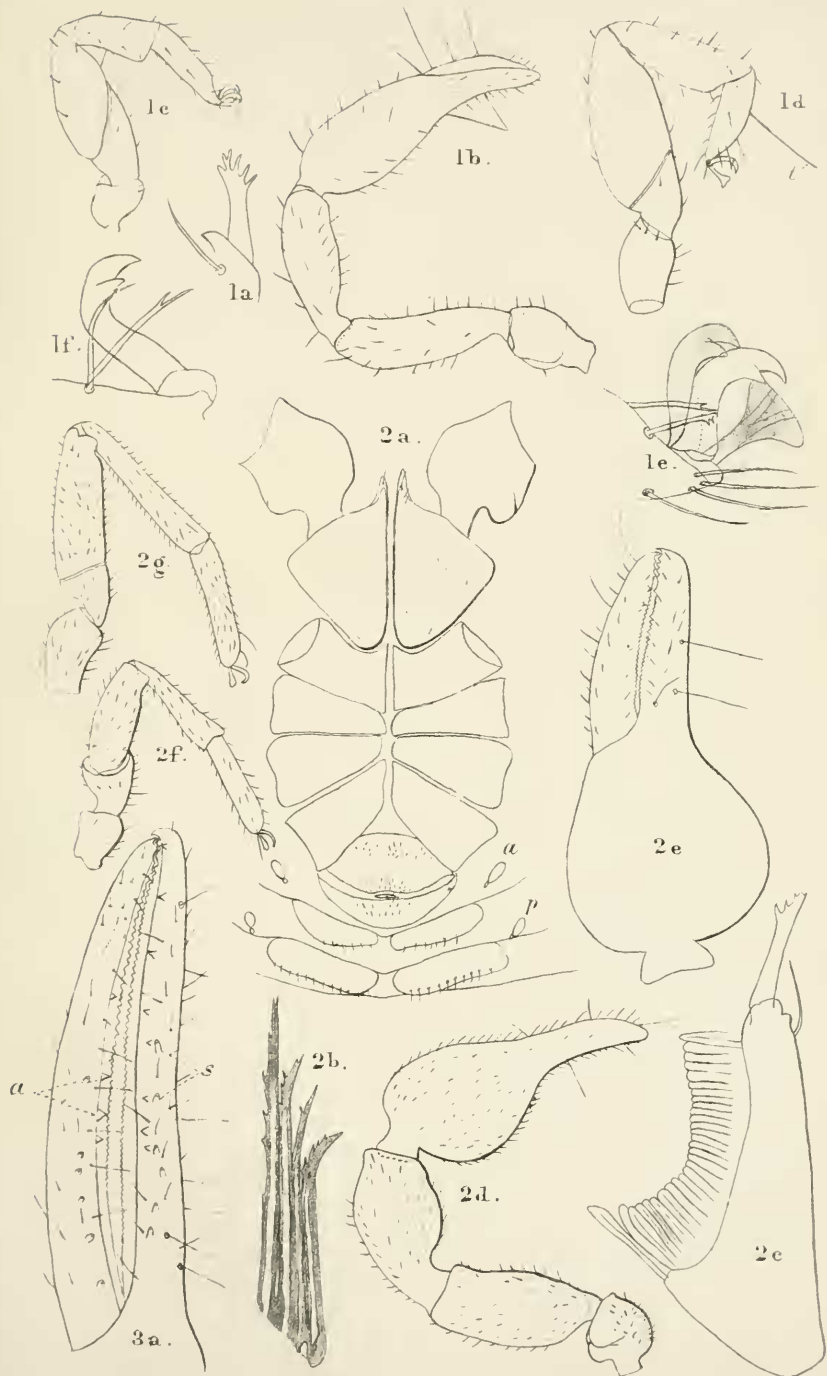


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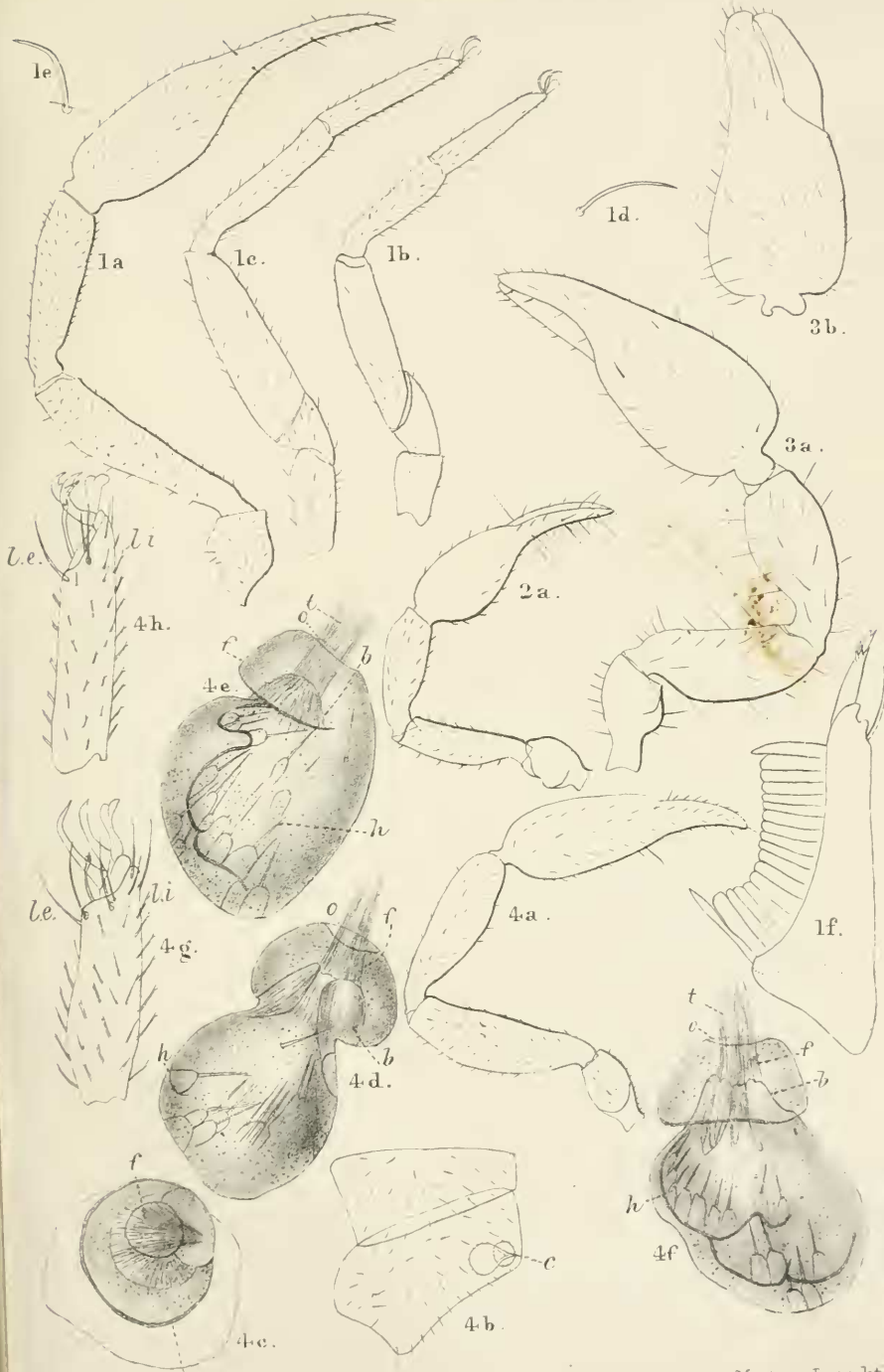
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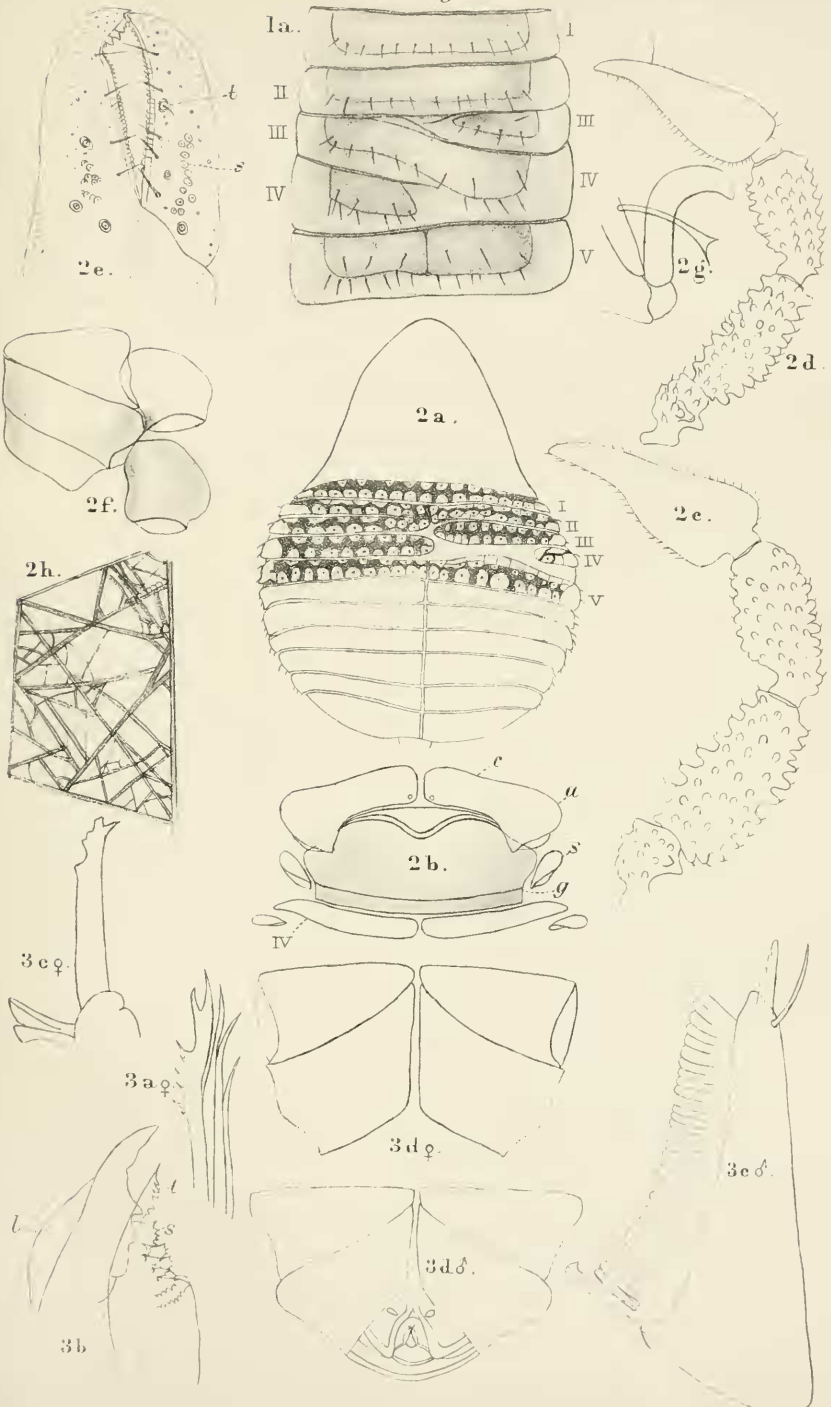


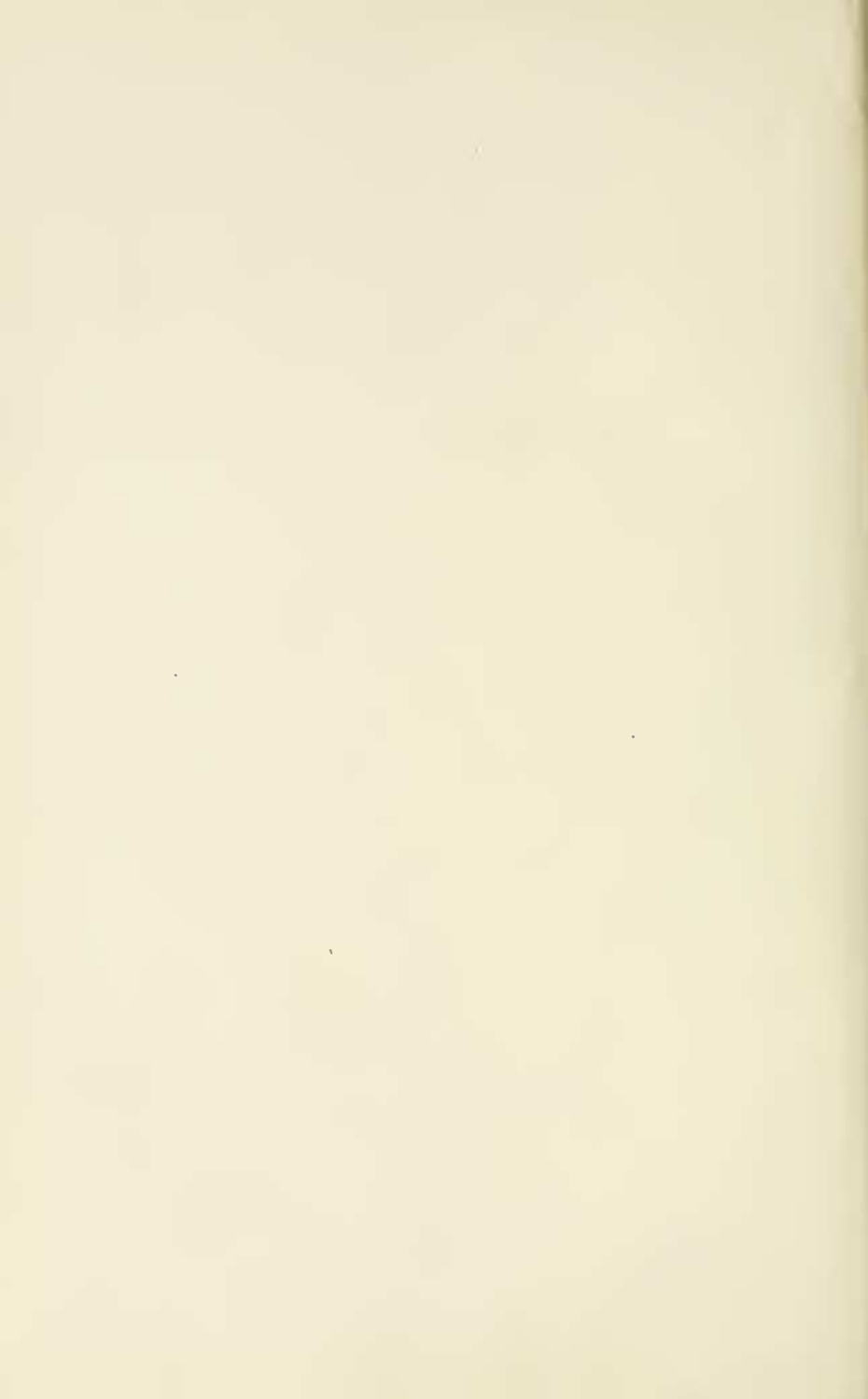


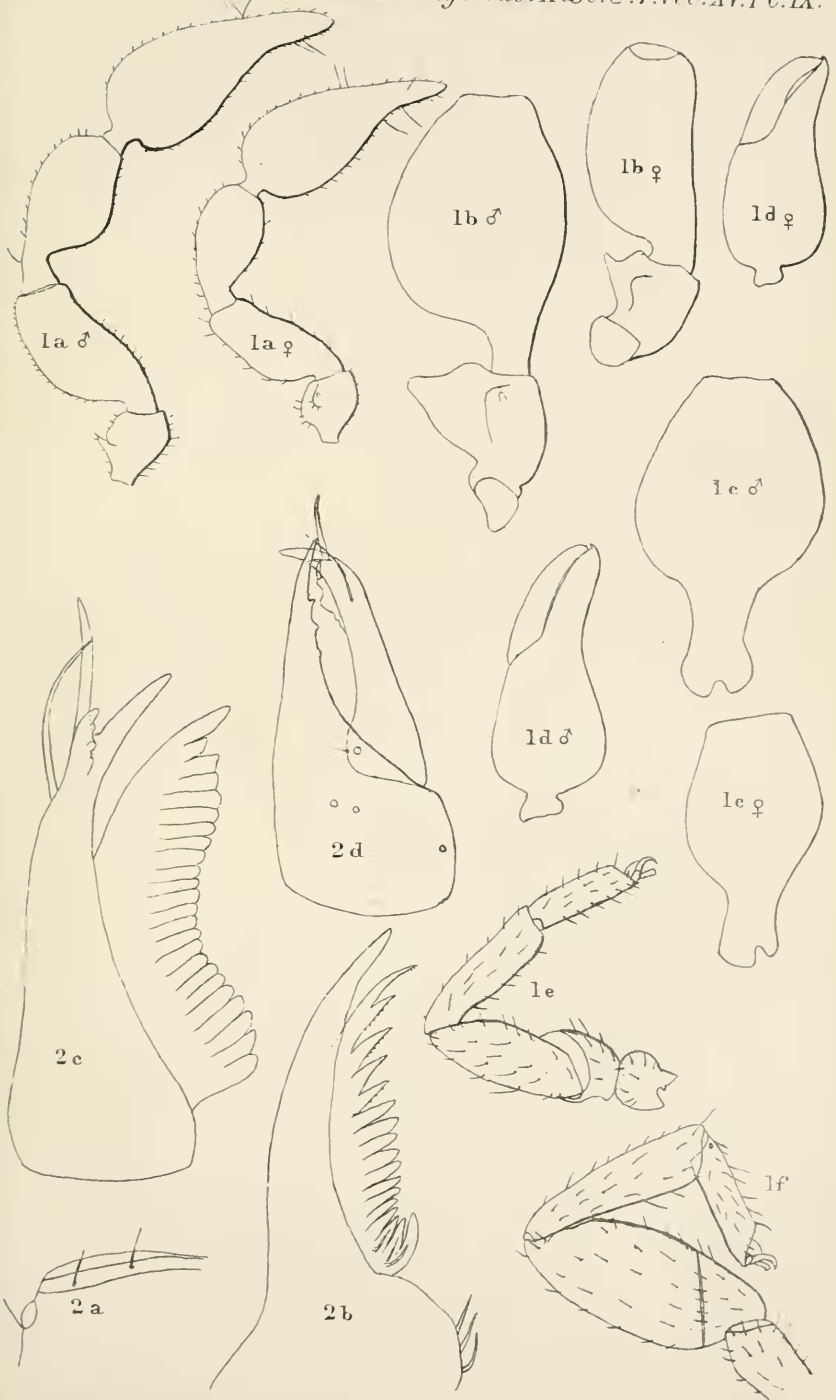






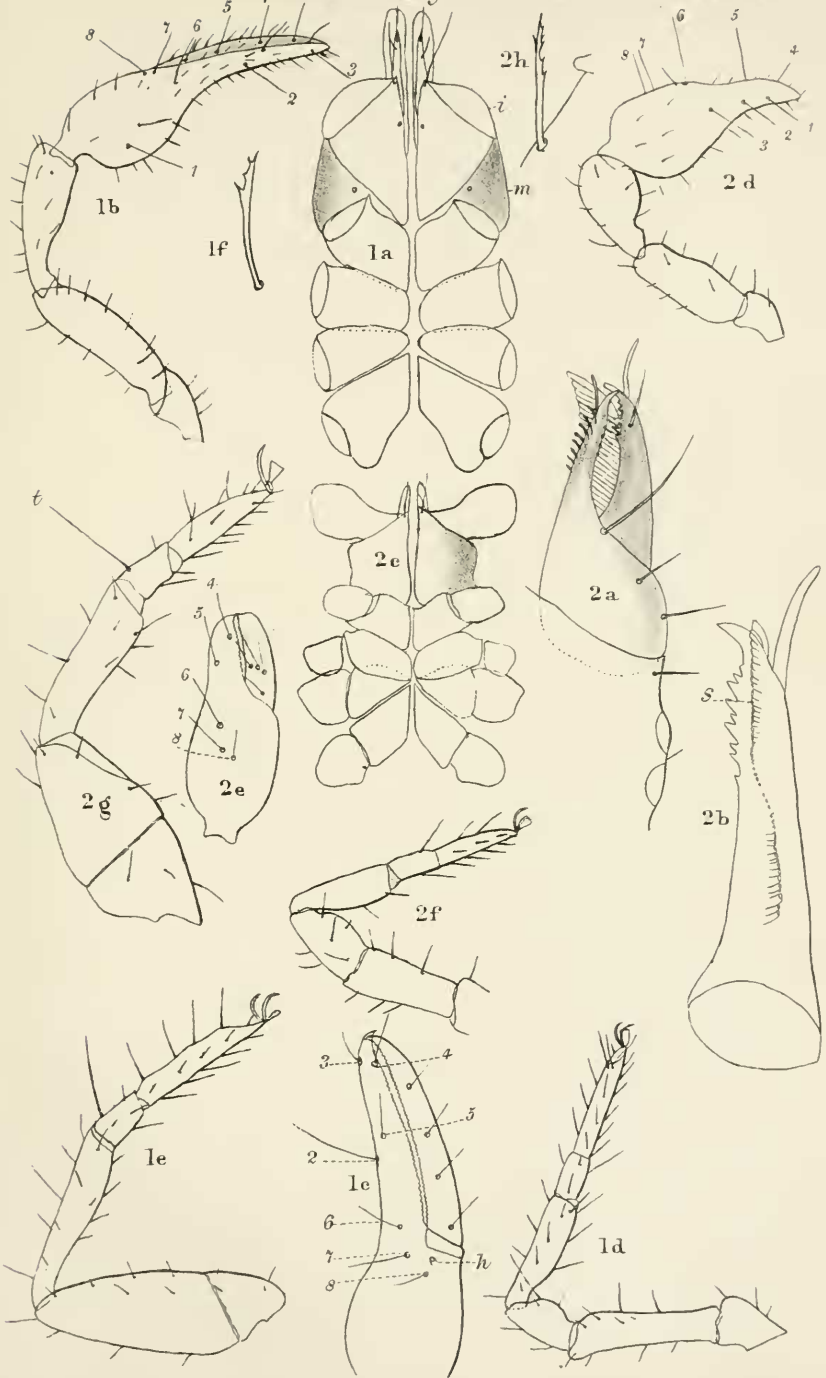














THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY.

[SEVENTH SERIES.]

No. 86. FEBRUARY 1905.

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XI.—*New Species of Eastern Heterocera in the National Collection.* By Colonel CHARLES SWINHOE, M.A., F.L.S., &c.

Family Chalcosiidæ.

*Chalcosia electra*, nov.

♂. Frons white, shaft of antennæ metallic blue, pectinations black; head and thorax black, covered with metallic-blue scales; abdomen pale ochreous brown, with white segmental thin bands: fore wings dark greenish black, with a dark dull ochreous subapical band, like two oval spots joined together, extending from close to costa beyond the middle to near outer margin above the middle; a white space on the hinder margin, which in the type specimen is pure white and in the other is white suffused with brown: hind wings white, with a black apical border, broad at the apex and narrowing down the outer margin; in the Santabong example with black streaks below the costa; some metallic-blue scales at the base of the fore wings in the type specimen, on both wings in the other. Underside much as above, but there is much blue scaling on the basal portion of the fore wings and at the apex of both wings: body and legs white.

Expanse of wings  $1\frac{1}{2}$  inch.

1 ♂, Pewisoon, Borneo (*Shelford*) (type).

1 ♂, Santabong, Borneo (*Shelford*).

I know of no near ally.

## Family Drepanulidæ.

*Problepsidis neoma*, nov.

♂. White, suffused with pale chestnut-brown irrorations in parts; two nearly straight brown lines from the abdominal margin of the hind wings, the first from one third, the other from the middle, run parallel across both wings and suddenly converge on the middle of vein 5 of fore wings, and run from thence in a single line to the costa near the apex; between these lines on the fore wing is a large hyaline space; the rest of the wing is lightly suffused; on the outer margin there is a fairly broad pale pinkish band, composed of large pale pinkish spots joined together; marginal line brown; cilia pale pinkish, marked with brown: hind wings with the inner area nearly white, the outer area from the outer line to the margin with dark suffusion, and through the middle of the disk a dentated white line; marginal line white; cilia white and brown. Underside white, the hyaline patch on fore wings prominent, bordered outwardly by a dark brown band: hind wings with a broad dark brown band, which covers a third of the wing.

Expanse of wings  $\frac{9}{16}$  inch.

Singapore (*Ridley*).

Allied to *carneotincta*, Warren, = *excisa*, Hmps. n.

*Problepsidis tristis*, nov.

♂. White; pectinations of antennæ ochreous: fore wings with a broad pale brown medial band from the middle of hinder margin to the upper end of the cell; a similar marginal band from the hinder angle to vein 6, through which runs a white dentated line: hind wings with very faint indications of two similar bands; on the medial bands of both wings are some white, iridescent, raised scales. Underside white; fore wings with a brown band from the middle of the hinder margin, which is curved at vein 6 and runs down again to the hinder margin near the angle.

Expanse of wings 1 inch.

Matang, Borneo (*Shelford*).

Has the fore wing somewhat excavated below the apex, and is allied to *carneotincta*, Warren.

*Callidrepana pilana*, nov.

♀. The upper half of the hind wings, including the entire cell, is whitish; otherwise the entire coloration of body and

wings is very uniform dark ochreous, covered with very minute iridescent white scales, and on the middle of the fore wings a few black atoms; a straight dark orange line runs from below the middle of the abdominal margin of the hind wings to near the falcated apex of the fore wings (obsolete on the whitish portion of the hind wings); an indistinct indication of a dentated orange submarginal line on both wings and dark marginal line and cilia. Underside of a uniform pale orange ochreous, without any markings.

Expanse of wings  $1\frac{1}{2}$  inch.

Matang, Borneo (*Shelford*).

Antennæ bipectinate, the branches short.

### Family Limacodidæ.

#### *Parasa insignis*, nov.

♂ ♀. Of a uniform dark bright chocolate-colour; a pale spot on the palpi above near the tip; a green spot behind the base of each antenna; a green antemedial transverse band on the fore wings from before the middle of the hinder margin to the middle of the costa, narrow and broken in the male, broad and unbroken in the female, and somewhat expanded on the costa. Underside of the same uniform dark bright chocolate-colour; a whitish space on the basal half of the hinder margin of fore wings; legs with pale spots. The female is paler chocolate than the male, the hind wings and the underside considerably paler.

Expanse of wings, ♂  $1\frac{2}{10}$ , ♀ 2 inches.

♂ ♀, Borneo, 1904 (*Shelford*) (types).

1 ♂, Borneo, 1904 (*Shelford*).

1 ♀, Kuching, Borneo, 1902 (*Shelford*).

Belongs to the *lepida* group.

### Family Lymantriidæ.

#### *Euproctis dirtea*, nov.

♂. Antennæ, palpi, head, thorax, and fore wings dark dull greyish ochreous; palpi brown above; shaft of antennæ brown, a white spot at the base on each side: fore wings irrorated with black atoms; a prominent black spot at the end of the cell; two dark grey, transverse, even bands, antemedial much outwardly curved, the other discal and very slightly curved; a concolorous cilia with grey patches: hind wings dull yellow; the abdominal area broadly brownish; abdomen brownish black; anal tuft dull yellow. Underside

of a pale dull ochreous, the abdominal area of hind wings brownish; a prominent large black spot at the end of the cell in both wings: body and legs without markings.

Expanse of wings  $1\frac{8}{10}$  inch.

Kuching, Borneo, 2 ♂ (*Shelford*).

Belongs to the *plana* group.

#### Family Hepialidæ.

##### *Palpifer pellicia*, nov.

♂ ♀. Of a uniform dull brown colour above and below, a slight red tinge on the hairs of the legs: the fore wings above have a very small white dot in the middle of the cell, which, however, is not visible in all examples; the hind wings have a moderately large yellowish spot on the outer margin below the apex; there are no other markings.

Expanse of wings  $1\frac{8}{10}$ – $1\frac{1}{10}$  inch.

Khasia Hills.

Allied to *P. cærulescens*, Swinhoe; paler in colour, the wings more sparsely clothed, and uniformly smaller; *cærulescens* has a prominent large white spot in the middle of the cell of fore wings and no yellow spot on the hind wings. I have five examples of this new form and have examined several others.

#### Family Trifidæ.

##### *Caradrina pratexta*, nov.

♂ ♀. Ochreous brown; palpi with pale hairs in front; thorax with a brownish band in front; abdomen of the male with blackish-brown hairs and luteous anal tuft: fore wings variegated with pale luteous-grey marks; a pale antemedial transverse line, edged on each side with brown, a short outward angle in the middle, and bent inwards shortly on to the costa and on to the hinder margin; a postmedial similar line, which, however, is not bent inwards at its lower end; a submarginal sinuous pale line, edged on its inner side with brown; orbicular a small black spot, pale-ringed; reniform black, large, somewhat ear-shaped, and ringed with a pale line: hind wings pale brown, a brown lunule at the end of the cell; marginal line pale, interrupted on fore wings: cilia of fore wings brown, of hind wings luteous, with a brown basal line. Underside grey; a brown lunule at the

end of each cell; both wings with dark grey discal lines and pale submarginal fascia.

Expanse of wings  $1\frac{1}{10}$  inch.

Khasia Hills.

There is an example from Darjiling in the B. M., drawer 142.

*Euplexia flavistigma*.

*Xylophasia flavistigma*, Moore, P. Z. S. 1867, p. 50; Hmps. no. 1715.

*Xylophasia sodalis*, Butler, Ann. & Mag. Nat. Hist. (5) i. p. 83; Hmps. no. 1717.

*Apamea strigidisca*, Moore, P. Z. S. 1881, p. 346, pl. xxxviii. fig. 9.

*Apamea basalis*, Moore, l. c. p. 346.

*Apamea denticulosa*, Moore, Lep. Atk. p. 109, pl. iv. fig. 13 (1882).

*Apamea obliquiorbis*, Moore, l. c. p. 109.

Khasia Hills; common.

The type from Bengal is in Coll. Staudinger, but the description is good, and there can be no mistake about the identification; the type of *sodalis* from Japan is in the B. M., so are also the types of *strigidisca* from Sikkim, *basalis* from Dalhousie, and *obliquiorbis* from Darjiling; the type of *denticulosa* from Darjiling is also in Coll. Staudinger, but the description and figure are good: all the above are undoubtedly one species. Sir George Hampson puts *Havlena constellata*, Moore (Lep. Atk. p. 130, pl. iv. fig. 21), from Sikkim, the type of which is also in Coll. Staudinger, as a synonym to *flavistigma*, but neither the description nor the figure corresponds.

Family Acontiidæ.

*Agrophila burmana*, nov.

♂. Frons with a pale luteous band; thorax and fore wings luteous white; abdomen grey, with white rings: fore wings with a very broad blackish-brown marginal band, occupying nearly half the wing; this band has a clearly cut inner edge, is narrow at the apex, curves round the reniform to the middle of the wing, then almost straight down to the hinder margin; the rest of the wing is luteous white, with a medial double line, nearly erect, and some pale blackish-brown marks on the costa; marginal line whitish; the reniform is a round ringlet, the orbicular is not visible: hind wings brownish, without markings.

Expanse of wings  $1\frac{7}{10}$  inch.

Beeling, Burma (*Bingham*).



I have several examples, all identical; it appears to be a good and uniform species. There is one in the B. M. from Thyetmyo, Burma, in drawer 195, with *A. basifera*, Walker.

*Maliattha stolasa*, nov.

♂ ♀. White, minutely irrorated with chestnut-red atoms; palpi, frons, and antennæ chestnut-red: fore wings with the costal border and outer portions suffused with that colour; some white specks on the costa; indications of two outwardly curved white lines before and beyond the middle rather close together; a white transverse streak below the apex close to the outer margin: hind wings grey; marginal line of both wings white; cilia white, interlined with grey.

Expanse of wings  $\frac{8}{10}$  inch.

Khasia Hills.

Allied to *M. plumbata*, Butler, from Dharmasala, which I also have from Simla; is common in the Khasia Hills. There is in the B. M. drawer 199, unnamed, one from Arjuno, Java, and one from Sarawak, which appear to me to be identical with the Khasia Hill form.

*Cerynea rubra*, nov.

♂. Palpi, frons, and head chocolate-brown; body and wings reddish-orange colour: costa of fore wings broadly chocolate-brown; two brown dots at the end of the cell; a pale lunular mark halfway between these and the outer margin: hind wings with a brown mark in the cell, some in the middle, and some in the disk; apparently indications of transverse bands, of which there are also some indications on the fore wings: both wings variegated with marks of darker orange; brown marginal fcostoon and black spots. Underside smoky grey, the wings crossed by three indistinct grey bands; legs brownish grey.

Expanse of wings  $\frac{9}{10}$  inch.

Matang, Borneo (*Shelford*).

Allied to *ustula*, Hmps., from Ceylon, and superficially somewhat resembling it; but that insect has broader wings and two spots at the end of each cell.

*Rivula niveipuncta*, nov.

♂. Palpi, head, and collar pale ochreous grey; thorax and fore wings dark olive-brown; spots on fore wings pure white, subbasal, ante- and postmedial, and two close to the apex;

two white dots below the second spot, a cluster of many spots and dots below the third, three dots on the costa between the third and fourth, with two or three dots below them; a large white subbasal spot within the wing and two dots in a line beyond: hind wings and abdomen pale brown, without markings. Underside: fore wings grey, with the apical spots and some spots and dots on the outer half of the costa: hind wings whitish, with a grey spot at the end of the cell and a grey discal line.

Expanse of wings  $1\frac{7}{10}$  inch.

Khasia Hills.

Somewhat resembling *R. niphosticta*, Hmps., from Ceylon, but the spots on the fore wings are differently arranged.

### Family Palindidæ.

#### *Homodes irretita*, nov.

♂. Of a uniform dull dark fulvous, brighter than *fulva*, Hmps., which I have from Ceylon, but duller than in *crocea*, Guenée, or *vivida*, Guenée, the margins slightly darker than the interior portions of the wings; antemedial and medial slightly waved, dark transverse lines nearly erect on the fore wings, the inner line continued on the hind wings, curving slightly outwards; duplex dentated discal lines across both wings, the inner line having black points on the dentations on the hind wings; the first three lines ending in black dots on the costa of the fore wings; duplex dark red submarginal lines on both wings, enclosing a series of small black lunular marks; black lunules close to the outer marginal black line; all the black points and lunules with minute white points attached to them. Underside of a uniform fulvous-red colour; fore legs with thick whitish hairs.

Expanse of wings  $1\frac{2}{10}$  inch.

Khasia Hills (type).

Silchar, Cachar.

There is one example in the B. M. from the Khasia Hills; there are also in the same drawer three from Fergusson Island, three from the Solomons, and three from Singapore which cannot be separated from this form. It is nearest to *bracteiugutta*, Walker, from Sarawak, the type of which is in Mus. Oxon.

### Family Sarrothripidæ.

#### Genus NANAGUNA, Walker.

*Nanaguna*, Walker, xxvii. 85 (1863).

*Clettharra*, Walker, xxvii. 101.

*Orosa*, Walker, xxxiv. 1222 (1865).

*Nanaguna breviuscula.*

*Nanaguna breviuscula*, Walker, xxvii. 85.

*Cattharra valida*, Walker, xxvii. 101; Hmps. no. 2237.

*Cattharra floccifera*, Hmps. Moths India, ii. p. 386 (1894).

Khasia Hills: common.

Also from Nagas, Burma, Ceylon, and Borneo; very variable in shades of colour.

*Nanaguna aquisoides*, nov.

♂ ♀. Palpi brown, white at the base and tips of the last joint; frons brown; head and thorax white, the latter with brown specks; wings and abdomen dark olive-brown: fore wings with white suffusion, speckled with brown at the base and on the costal and apical areas, forming a circle round the brown portion of the wing; indications of a subbasal brown line, of a discal line outwardly angled at vein 3, and of a sub-marginal line, but all very indistinct; marginal line dark blackish brown: hind wings slightly pale brown, without markings. Underside dull brown, marginal line pale, no markings; tarsi with pale bands.

Expanse of wings  $1\frac{2}{10}$  inch.

Khasia Hills.

There is one example in the B. M. Deltoid drawer no. 45, without name, from the Khasia Hills; superficially this insect is much like *Aquis viridisquama*, Walker, xv. 1652, from Sarawak.

*Labanda viridalis*, nov.

♂ ♀. Frons, head, thorax, and fore wings green (the ground-colour is really white, thickly irrorated with minute green atoms): fore wings with a broad basal black band, some green markings inside it near the base, representing the subbasal transverse line; the discoidal vein thickly black, making a prominent lunule; an antemedial, slightly dentate, black line close to the outer margin of the basal band; an outwardly curved discal similar line, duplex in parts, a sub-marginal similar broken line outwardly edged with white; a marginal black line; cilia green, with black patches; a black suppressed largish spot on the costa at the middle, another much larger at one third from apex, and two small ones close to the apex, and two more prominent spots below them, the lower one the larger: hind wings brown, unmarked: abdomen brown, with black and green crests. Underside

brown, without markings, except for a few pale spots on the costa of fore wings.

Expanse of wings, ♂ 1, ♀  $1\frac{3}{10}$  inch.

Khasia Hills.

There is an example from the Khasia Hills in the B. M. drawer no. 44.

*Blennia fumosa*, nov.

♀. Palpi grey, brown-speckled; head, thorax, and fore wings chocolate-brown, with a slight greenish tinge; transverse lines slightly darker than the ground-colour, all very indistinct—first subbasal, sinuous, and double, second just before the middle, also double, bent outwards, third similar and discal, fourth submarginal, single, and marked with white and brown dots; a broad blackish shade or diffused oblique band from the middle of the costa to the hinder margin near the angle, marginal points whitish: hind wings paler and with an ochreous tinge, blackish on the outer margin; indications of a thin, ochreous, waved, discal band; cilia dull ochreous. Underside: body, legs, and inner half of wings pale greyish brown, outer half of wings dull black; some dull ochreous spots on costa of fore wings towards apex; both wings crossed by a thin dull ochreous band, outwardly angled below the middle on the hind wings; cilia of both wings dull ochreous.

Expanse of wings  $1\frac{8}{10}$  inch.

Khasia Hills.

Not nearly allied to anything I know of; fore wings narrower and longer than is usual in the genus, outer margin rounded.

Family **Haliadæ**.

*Topadesa sanguinea*.

*Topadesa sanguinea*, Moore, Lep. Atk. p. 280 (1882).

Khasia Hills.

Moore described a male from Sikkim, the type of which is in Coll. Staudinger; there is one male from Darjiling in the B. M.; I have now received several pairs from the Khasia Hills.

The female differs from the male in the colour of the fore wings being purple instead of fiery red, the fiery-red colour only showing on the edging of the purple; no cell-spot; the front half of the thorax is also purple and the upper part of the abdomen is smeared with pale purplish grey. The underside is much as in the male, cell-spot and all but the interior of the fore wing is suffused with purple.

## Family Stictopteridæ.

*Gyrtona niveivitta*, nov.

♀. Brown-black; abdomen pale black; the hind wings very slightly paler than the fore wings, the latter with a broad white subcostal stripe from the base to the outer margin a little below the apex; the upper side of the stripe even, the lower side rough; the orbicular invisible, the reniform a black ringlet, within the stripe; two submarginal sinuous white lines, well separated, pale spots on the outer margin and black crenulated line; cilia of both wings with white tips. Underside dull black, without markings.

Expanse of wings  $1\frac{9}{10}$  inch.

1 ♀, Kuching, Sarawak (type).

1 ♀, Penang.

## Family Gonopteridæ.

*Cosmophila excavata*, nov.

♀. Of a uniform pale greyish chocolate-colour; palpi on the inner sides, head, and collar white, thickly irrorated with ochreous brown: fore wings thickly irrorated with ochreous brown in parts, leaving a more or less clear space before the middle and a space at the apex: hind wings with similar irrorations on the disk, almost forming a band; through this and up the fore wings runs a very acutely dentated submarginal line; some brown marks above the middle of the outer margin of fore wings, one at the angle, and one at the apex; cilia of both wings pale ochreous, with white tips, interlined with brown, the interline macular on the fore wings above the angle.

Expanse of wings  $1\frac{7}{10}$  inch.

Sadong, Borneo (*Shelford*).

I do not quite know where to put this insect without examining its male; the apex of fore wings is acute, the outer margin is produced at vein 4 and rather deeply excavated between this and the apex; the outer margin of the hind wings is slightly angled at vein 2 and is quite straight between veins 2 and 6, like a Focillid.

*Tympanistes flavescens*, nov.

♂. Antennæ, palpi, head, body, and fore wings dull pale yellow; head, thorax, and costal and basal portions of fore wings suffused with olive-green; transverse olive-green lines distinct, prominent, highly sinuous, and dentated in parts—

subbasal, antemedial, postmedial, and submarginal, the last broken and irregular; outer margin with black dots between the veins: hind wings white, with pinkish suffusion on the abdominal area. Underside pale yellowish white; costal area of fore wings suffused strongly with pink; a brown subapical spot on the costa and another below it; legs with brownish hairs.

Expanse of wings  $1\frac{4}{10}$  inch.

Khasia Hills.

Between *T. testacea*, Moore, and *T. rubidorsalis*, Moore, but the lines in these forms are not dentated, are much less sinuous, the coloration is nearly white, and the undersides have no markings whatever.

#### *Carea dione*, nov.

♂ ♀. Antennæ, palpi, and frons chestnut-colour; collar and patagia purplish brown, the rest of the thorax, the abdomen, and fore wings pale creamy pink, with minute brown irroration; these are collected densely together in parts and form subbasal, antemedial, postmedial, and submarginal oblique bands, the postmedial being the broadest and darkest, extending from a little beyond the middle of the costa to the hinder angle; there are also two transverse, brown, straight lines, the first oblique, from the middle of the costa, the other nearly erect, from the costal third to the hinder margin near the angle; cilia brown: hind wings pale pinkish, without markings. Underside pale pinkish, without markings.

Expanse of wings  $1\frac{1}{2}$  inch.

Khasia Hills.

Fore wings with the outer margin rounded. Allied to *fasciata*, Moore, which I have also from the Khasia Hills; but that form is of an almost uniform dark brown-pink, with discal and submarginal highly sinuous transverse lines and shorter wings.

#### Family Quadrifidæ.

##### *Hypætra ruinosa*, nov. †

♀. Antennæ, palpi, head, thorax, and fore wings dark chocolate-brown; palpi whitish beneath, and speckled with white above: fore wings with the outer third smeared with a glaucous sheen; black patches on the costa; a large oval black patch on the disk, touching the glaucous band, ringed inwardly with deeper black; the black line running partly along the inner limit of the glaucous band; many lunular

and sinuous grey bands across the wing, more or less indistinct; a double black, sinuous, submarginal line: hind wings dark brown, the outer part more or less glaucous; two ochreous marks near anal angle; cilia dark brown, with two subapical white spots and one near anal angle.

Expanse of wings  $1\frac{7}{10}$ – $1\frac{9}{10}$  inch.

1 ♀, Singapore (type) (*Ridley*).

2 ♀, Kuching, Borneo (*Shelford*).

1 ♀, Andamans (*Moore Coll.*).

Allied to *inclusens*, Walker.

### *Hypatra trifasciata*, nov.

♂. Palpi dark chestnut-brown above, white beneath, last joint ochreous grey beneath; head, body, and wings of a uniform pale brownish grey, irrorated and striated in parts with blackish brown: fore wings crossed by three nearly erect blackish fasciæ or bands, rather broad and more or less incomplete, these bands themselves containing in places small darker black patches, marginal festoon grey, points black: hind wings paler on the costal space, where there are no irrorations; indications of a discal transverse line, elbowed outwardly below the middle, where there is a black spot, marginal festoon grey, points grey. Underside ochreous grey, almost whitish, very uniform in colour, no markings; the long hairs on the legs variegated, black and ochreous grey.

Expanse of wings  $1\frac{7}{10}$  inch.

1 ♂, Kapaur, N. Guinea (type) (*Doherty*).

1 ♂, Fergusson Island (*Meek*).

### *Hamodes Butleri*.

*Thermesia* (?) *Butleri*, Leech, Trans. Ent. Soc. 1900, p. 570.

Khasia Hills; fairly common.

The type came from Western China; the Khasia Hills examples are paler in colour, but are not separable.

### Family Focillidæ.

#### *Zethes pallidiplaga*, nov.

♂. Uniform greyish white, slightly tinged with ochreous; palpi brown, with pale tips; a pale chestnut-brown large patch on the thorax: fore wings with a subbasal broad band, a brown dot in the cell, a transverse sinuous line, a large almost square patch, its top touching the costa, its

lower end touching a transverse, outwardly bent, pale line; a large, also nearly square, patch on the outer margin at the apex; a submarginal grey line and brown marginal spots: hind wings with antemedial and submarginal sinuous grey lines, a medial straight pale line, a large chestnut-brown patch at the anal angle.

Expanse of wings  $1\frac{7}{10}$  inch.

Penang (*Flower*) (type).

Isabel Island, Solomons (*Meek*).

The Isabel example has the patches smaller, but is otherwise very similar to the type specimen.

*Zethes enigmaria*, nov.

♂ ♀. Dark red-brown, with an ochreous tint and variegated with ochreous patches: fore wings with ochreous dots on costa towards apex; ante- and postmedial outwardly curved sinuous brown lines; a large ochreous spot at the end of the cell, with a thin brown lunular mark inside it; an ochreous spot in the disk in a line with the cell, another near the hinder angle: hind wings with an antemedial line, a medial line, the space between forming an ochreous band; a discal line, the outer portion of the wing mostly ochreous; the ochreous parts mostly dull in colour; a marginal lunular line on both wings and cilia with a basal ochreous line. Under-side pale pinkish grey on fore wings, ochreous on the hind wings, the former with a black subapical lunular spot on the costa; indications of medial and discal lines, the outer portion of the wing suffused with purplish brown: hind wings with an antemedial line; a broad discal black band and both wings with black marginal line; blackish cilia with ochreous basal line.

Expanse of wings  $1\frac{4}{10}$  inch.

Khasia Hills.

Allied to *Z. perturbans*, Walker.

Family *Deltoididæ*.

*Talapa birtana*, nov.

♀. Palpi black, with whitish hairs on the upper side; head, body, and wings of a uniform pale brown, tinged with pink; thorax with a black patch; abdomen with brown segmental lines: fore wings with some short brown marks running along the costa; a black triangular patch before the middle below the cell, its outer side incurved, and edged with white, a black spot just above its outer end; a large black



suffused spot outside the patch nearly even with its upper side, and in this patch is a prominent white spot, with a short streak running from it obliquely upwards, and through it runs a transverse, indistinct, sinuous grey line from costa to hinder margin; a discal sinuous line, which is (except towards the costa) deep black and thick, outwardly edged with whitish, and followed by a whitish line close to it; between this and the outer margin is another sinuous but incomplete whitish line; marginal lunules brown, with whitish points; cilia with pinkish-white streaks opposite the veins: hind wings with indications of a medial pale line and pale marginal line.

Expanse of wings  $1\frac{4}{10}$  inch.

Khasia Hills.

Allied to *T. albigutta*, Swinh.

*Adrapsa curiosalis*, nov.

♂ ♀. Dark blackish brown, with a pink tinge: fore wings with a white dot in the cell, a white spot at the end, and a large white square patch near the apex, with a white streak to the costa on its inner side; both wings with a medial, slightly sinuous, transverse, white line, dentated in parts; a discal similar line rather near the margin, indistinct in parts and touching the inner side of the subapical patch; marginal line whitish, lunular in parts. Underside rather variegated in colour; a white spot at the end of each cell; the subapical patch and transverse lines as above; antennæ, body, and legs same colour as the wings, the long hairs on the fore legs of the male pale dirty whitish ochreous.

Expanse of wings, ♂  $1\frac{3}{10}$ , ♀  $1\frac{7}{10}$  inch.

Khasia Hills.

The antennæ are somewhat as in *A. albirenalis*, Moore, but there is no hook at the base, as is the case in that species; one male in my collection is almost as much variegated in colour above as it is below, with a pale shade inside the medial line.

*Catada sabada*, nov.

♂. Antennæ, palpi, head, and body dark olive-brown: fore wings with a broad band of the same colour, which occupies nearly the basal half of the wing, leaving a small basal space and the outer half of the wing dark pinkish grey; the band has on each side slightly sinuous but erect white

edges ; a brown semicircular mark near the apex : hind wings and underside of a uniform dull brown, without markings.

Expanse of wings, ♂  $1\frac{9}{10}$ , ♀  $1\frac{1}{10}$  inch.

Goping, Perak (*Kunstler*).

Superficially like *C. bipartita*, but that form has the fore wings angled in the middle of the outer margin ; in this form the outer margin is rounded.

*Falcimala diacia*, nov.

♂ ♀. Palpi brown on the outer side, pale on the inner side, last joint whitish, with a brown ring near the tip ; frons whitish ; collar brown in the middle, white at the sides ; body and wings whitish : fore wings with a black streak on the costa near the base, a large oblique black patch at the middle, the costal space from thence to the apex white ; a nearly upright, broad, pale medial band from the patch to the hinder margin, the patch and band edged with white ; the colour of the wing inside the band white, on the outer side it is smoky brown ; a subbasal line of white specks ; the extreme apex pure white ; the marginal line with black points joined to very minute white specks : hind wings greyish white. Underside : fore wings pale grey, with white dots on the costa beyond the middle and at the apex : hind wings whitish.

Expanse of wings  $1\frac{7}{10}$  inch.

Khasia Hills.

Allied to *F. ochrealis*, Hmps., which is pinkish ochreous, has no medial band on fore wings, and has brown hind wings.

Family Hypenidæ.

*Hypena regia*, nov.

♀. Palpi, head, and body dark greyish-olive colour : fore wings dark olive-brown ; a large round prominent white spot in the middle of the cell, a black lunule at the end ; a postmedial, nearly straight, black line from the hinder margin at two thirds to the costa near apex ; an irregular row of indistinct submarginal dots, the four upper ones white, the remainder black ; a pale shade across the disk : hind wings brownish grey, whitish towards base. Underside pale brownish : fore wings with a small cluster of white dots at the apex : hind wings with a brown lunule at the end of the cell ; both wings crossed by a medial brown line.

Expanse of wings  $1\frac{4}{10}$  inch.

Granville, New Guinea.

Allied to nothing I know of.

*Hypena tylistalis*, nov.

♀. Olive-brown, with a pink tinge. fore wings with erect transverse lines, antemedial and slightly sinuous, postmedial and quite even, composed of two colours, the inner brown, the outer white; the whole inner space from this to the base darker than the rest of the wing; a sinuous line adjoining, followed by a nearly straight submarginal line: hind wings without markings, marginal line of both wings black; cilia with a white basal line. Underside much paler: fore wings with a white subapical spot: hind wings with a brown spot at the end of the cell and a brown discal line.

Expanse of wings  $1\frac{1}{2}$  inch.

Granville, New Guinea.

Allied to *H. umbripennis*, Moore, from India, of which I have a good series; but that form has all its lines sinuous.

*Hypena phecomalis*, nov.

♂. Dark olive-brown; palpi white at the end of the last joint: fore wings with an erect, almost straight, brown line, outwardly edged with whitish beyond the middle, the entire space inside it dark blackish brown, and contains a darker spot at the end of the cell and a darker basal band, with its outside edge acutely dentated outwards, below the middle; a dark brown shade below the apex, leaving a paler space on the costa near the apex; faint indications of a row of submarginal pale dots and white points on the margin: hind wings without markings. Underside pale brown, tinged with pink: fore wings with indications of postmedial and submarginal lines: hind wings with a black spot at the end of the cell, and medial and discal lines.

Expanse of wings  $1\frac{1}{2}$  inch.

Khasia Hills.

Wings broader than is usual in the genus, the hinder angle more rounded, costa of fore wings rounded near the base. There are two examples from the Khasia Hills in the B. M. with *H. tenebralis*, Moore, of which I have a fine series; but it is quite distinct from that form, being a much broader insect, with the lines erect instead of oblique.

## Family Boarmiidae.

*Heteromiza obliquaria*.

*Anzea obliquaria*, Leech, Ann. & Mag. Nat. Hist. (6) xix. p. 182 (1897).

Khasia Hills.

Leech's type came from Chang Yang, Central China. I have six from the Khasia Hills, and there is an example in the B. M. marked "India" from Dr. F. Moore's collection; they are absolutely identical with the Chinese examples.

### Family Sterrhidæ.

#### *Chrysocraspeda fulviplaga*, nov.

♂ ♀. Orange-pink, tinged with purple: fore wings with a prominent black spot at the end of the cell; an antemedial, transverse, yellow line, angled slightly outwards in the cell; a discal similar line, angled outwards at the middle, its lower half obscured in the male by a large patch of purplish suffusion, which extends on the lower half of the wing from the inner line to the outer margin: hind wings with a yellow subbasal line, much angled outwards at its middle; a very large triangular yellow patch, occupying nearly the whole of the disk; a discal yellow line like that on the fore wings, the upper portion of it being only visible, the lower portion being merged in the discal yellow patch; cilia of both wings bright yellow. Underside: fore wings pink-red, with the outer and hinder margins yellow: hind wing with the inner half pink-red, the outer half yellow; frons white; antennæ, body, and legs pink-red; abdomen with the tips and the whole of the underside whitish.

Expanse of wings, ♂  $\frac{9}{10}$ , ♀  $1\frac{2}{10}$  inch.

Khasia Hills.

Belongs to Hampson's Section I. B, and is allied to *iole*, Swinhoe; the hind wings resemble those of *dilucida*, Warren, but that form has no transverse lines.

#### *Chrysocraspeda conspicuaria*, nov.

♂ ♀. Pale pink, irrorated in parts with brown atoms; costa of fore wings brownish; a large black spot at the end of the cell, three or four black points in a row outside the cell: hind wings with a pure white elongated spot at the end of the cell; a discal row of black points; outer margin of both wings with a conspicuous brown band and bright yellow cilia. Underside of a uniform dark red-pink; cell-spots as above, but less distinct; costa of fore wings blackish brown; no outer marginal band to either wing; cilia yellow; frons white; antennæ and body above pink-brown; body below and legs whitish.

Expanse of wings  $\frac{9}{10}$  inch.

Khasia Hills.

Fore wings with the apex produced and acute; hind wings with the outer margin rounded. Belongs to Hampson's Section I. *b*, and is allied to *abhadraca*, Walker; but the markings are much as in *sanguinaria*, Warren.

### Family Geometridæ.

#### *Actenochroma ochreipicta*, nov.

♂. Frons ochreous, with a green centre; head, body, and wings green, irrorated and striated with olive-green; an indistinct blurred dark spot at the end of each cell: fore wings with indications of antemedial and discal darker bands, the hinder margin with two ochreous spots, ante- and post-medial, and another in the disk above the middle; inside the outer band there is a dentated black line visible in places, but very indistinct: hind wings with a similar line, more distinct, and indications of both bands; an ochreous spot on the abdominal margin at the end of the outer band; marginal lunules black; cilia ochreous in parts. Underside pinkish white; a prominent black spot at the end of each cell and a broad blackish discal band, with some blackish suffusion between it and the outer margin; marginal lunules black.

Expanse of wings  $1\frac{8}{10}$  inch.

Khasia Hills.

Of the shape and size of *A. viridaria*, Moore, but the colour is darker, more olive-tinted, and quite different.

#### *Agathia ithearia*, nov.

♂. Antennæ, palpi above, head, and body pale chocolate-colour; palpi below white; frons with the lower half white, upper half chocolate; thorax with two large green spots in front: wings green, bands chocolate-colour; fore wings with a band at the base, a narrow costal band, and both wings with a broad marginal band; on the fore wings there is a thin sinuous band from the middle of the costa to the hinder margin, touching the marginal band; within the latter is a large green subapical spot, with a small spot above and two below it: a large green oval spot on the hind wings within the marginal band, touching the outer margin below the apex, and a pale streak which runs downwards a short distance: on both wings the marginal band is lined on both sides with dark chocolate and edged on the inner side with whitish.

Underside greenish white, with a broad, sinuous, discal band of pale chocolate-colour across both wings.

Expanse of wings  $1\frac{4}{10}$  inch.

Kuching, Borneo (*Shelford*).

Nearest to *carissima*, Butler, from Japan.

*Agathia solaris*, nov.

♂. Antennæ, upper side of palpi, upper half of frons, thorax above, and bands on both wings chocolate-colour, lower side of palpi and lower half of frons white; a green band behind the base of the antennæ, a broader green collar, a green spot on the hind part of the thorax; abdomen with the apical third pale, nearly white, the tip chocolate: wings green; fore wings with a narrow costal band, very pale chocolate; a sinuous submarginal band, broad and curved and dark chocolate (nearly black at the apex), touching a black spot on the outer margin below the apex, then continued, thin, pale, and sinuous, to the hinder margin near the angle; black elongated spots on the margin at the ends of the veins, followed by chocolate spots on the ochreous-grey cilia; a narrow chocolate band at the base, which does not reach the costa, which here is green; this band is continued thinly down the abdominal margin of the hind wings (with a spot in the middle) until it reaches the broad outer marginal band, which is broad at the anal angle, narrowing upwards, contains a green spot where the abdominal band joins it, and a larger green spot below the apex, which is narrow and runs down the margin a little; this outer band on both wings contains on its inner margin an acutely dentated dark line with the points black and pointing outwards, on the fore wings obsolete on the thin part of the band; marginal line of hind wings chocolate, cilia ochreous grey, with chocolate spots at the vein-ends. Underside greenish white; bands nearly black, on fore wings more or less as above, on the hind wings nearly uniform in breadth.

Expanse of wings  $1\frac{4}{10}$  inch.

Singapore (*Ridley*).

There are some indistinct chocolate marks in the middle of the wings that look like obsolete bands, but they are not traceable; the insect belongs to the *hemithearia* group.

XII.—*List of the Snakes in the Zoological Museums of Lund and Malmö, with Descriptions of new Species and a new Genus.* By NILS ROSÉN, Zool. Inst. Lund.

[Plates XI. & XII.]

AT the request of the Director of the Zoological Museum of Lund, Prof. D. Bergendal, I have determined and revised the collections of snakes in that Museum. The specimens not determined belong principally to collections made by Dr. Hj. Möller in Java (1897), by Dr. N. Holst in West Australia (1897), and by Bar. Eggers in Ecuador. Through the kindness of Dr. H. Wallengren I have further had the opportunity of examining some snakes in the Museum of Malmö. I have found five species and one genus not previously described. A description of these and notices respecting some specimens which differ from the typical examples form the subject of this paper. As regards the systematic classification and nomenclature, I have followed G. A. Boulenger, 'Catalogue of the Snakes in the British Museum,' vols. i.—iii. (1893-96). Some snakes were presented by private individuals, without any information as to habitats.

Fam. Typhlopidae.

1. *Typhlops braminus*, Daud.  
Java.
2. *Typhlops bicolor*, Ptrs.  
West Australia.
3. *Typhlops olivaceus*, Gray.  
West Australia.

Fam. Boidae.

4. *Python reticulatus*, Schn.  
Java.
5. *Python molurus*, L.
6. *Epicrates cenchris*, L.  
14 upper labials.
7. *Epicrates striatus*, Fisch.
8. *Corallus caninus*, L.  
Maroni (Surinam).

9. *Trachyboa gularis*, Ptrs., var. *multimaculata*, nov.

Snout scarcely prominent. Upper head-scales small, convex, keeled. Eye bordered by 2 labials (sixth and seventh) and 11 scales. 25 scales round the upper lip. Four pairs of shields bordering the mental groove. Scales strongly keeled, in 31 rows. Ventrals 146. Anal entire. Subcaudals 29. Brown above, with a dorsal series of large irregular black spots; two series of smaller ones on each side; yellow beneath, with large black spots.

Total length 320 mm.; tail 35.

Ecuador.

A single specimen, belonging to the Museum of Lund, collected by Eggers, 1892, in Balao (Ecuador).

Cf. Proc. Zool. Soc. of London, 1898, p. 115, where Boulenger describes a specimen from Ecuador differing by having the eye completely surrounded with 14 scales, labials being excluded.

10. *Eunectes murinus*, L.

Brazil.

11. *Boa constrictor*, L.

Fam. Ilysiidæ.

12. *Ilysia scytale*, L.13. *Cylindrophis rufus*, Laur.

Java.

Fam. Xenopeltidæ.

14. *Xenopeltis unicolor*, Reinw.

Sumatra.

Fam. Colubridæ.

Series AGLYPHIA.

15. *Acrochordus javanicus*, Hornst.

Java.

16. *Polyodontophis geminatus*, Boie.

Differs from the description in Cat. Snakes in having 8 upper labials, third, fourth, and fifth entering the eye.

Java.



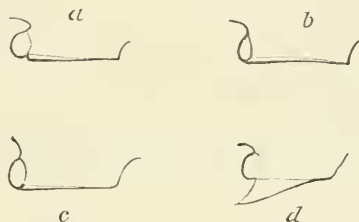
17. *Tropidonotus ordinatus*, L., var. *infernalis*.  
Oregon.
18. *Tropidonotus ordinatus*, L., var. *sirtalis*.  
Oregon.
19. *Tropidonotus saurita*, L.  
Total length of one specimen 970 mm. ; tail 290.  
North America.
20. *Tropidonotus natrix*, L.  
Sweden.
21. *Tropidonotus trianguligerus*, Boie.  
Java, Sumatra.
22. *Tropidonotus piscator*, Schn., type C.  
Scales sometimes feebly keeled or nearly smooth, reminding  
one of *Tr. Sancti-Johannis* (see Boul. Cat. Snakes, i. p. 230).  
Java.
23. *Tropidonotus tessellatus*, Laur.  
South Europe.
24. *Tropidonotus viperinus*, Latr.  
Algiers.
25. *Tropidonotus Clarkii*, B. & G.
26. *Tropidonotus tigrinus*, Boie.
27. *Tropidonotus vittatus*, L.  
Java.
28. *Tropidonotus subminiatus*, Schleg.  
Some specimens with third and fourth upper labials entering  
the eye.  
Java.
29. *Helicops angulatus*, L.
30. *Helicops modestus*, Gthr.
31. *Helicops leopardinus*, Schleg.

The last two species differ from the descriptions by not having any hypapophyses in the posterior region of the dorsal column. In *H. leopardinus*, Schleg. (which is represented in the Lund Museum by a single specimen), the lower surface of the dorsal vertebræ in the posterior region has a lower keel (text-fig. 1, *a*), without any crest or tubercle projecting

below the condyle. In *H. modestus*, Gthr. (two specimens in the collections), the lower surface is smooth (fig. 1, *b*).

In the 'Catalogue of Snakes' Boulenger has laid stress upon the presence or absence of hypapophyses on the posterior dorsal vertebræ, and, so far as I know, he has continued to do so. Among the snakes I have had an opportunity of examining I have, however, found several specimens which differ from species already described only by the presence or absence of the hypapophyses in the posterior region of the dorsal column. That these ought not to be regarded as new species or genera is quite certain, and consequently the hypapophyses are not of such great importance for classification as has been supposed. More extended examination of other species and genera is required.

Fig. 1.



Vertebræ in the posterior region of the dorsal column.

*a.* *Helicops leopardinus*, Schleg.

*b.* — *modestus*, Gthr.

*c.* *Trctanorhinus intermedius*, sp. n.

*d.* *Chrysopelea ornata*, Shaw, type A.

### 32. *Trctanorhinus intermedius*, sp. n. (Pl. XII. fig. 2)

*Without any hypapophyses on the posterior dorsal vertebræ* (text-fig. 1, *c*).

Nasals separated. Internasals small. Frontal much shorter than the parietals. One loreal, about twice as long as deep. Two præoculars. Two postoculars. Temporals 1+2. Eight upper labials, fourth entering the eye. Five lower labials in contact with the anterior chin-shields. Posterior chin-shields separated from each other by scales. Scales in 21 rows, striated, with short but strong keels. Ventrals 142. Anal divided. Subcaudals 56. Dark brown above, with a dorsal series of irregular black spots, sometimes confluent. An indistinct yellow, dark-edged, lateral streak.

Yellow beneath, with brown dots, anteriorly dark, with an indistinct black median line.

Total length 520 mm. ; tai 120.

Central America.

33. *Elapoides fuscus*, Boie.

Nasal entire.

Java.

34. *Lycodon aulicus*, L.

35. *Lycodon subcinctus*, Boie.

Java.

36. *Zamenis korros*, Schleg.

Java.

37. *Zamenis constrictor*, R.

Eight upper labials, fourth and fifth entering the eye.

North America.

38. *Zamenis flagelliformis*, Laur.

South Carolina.

39. *Zamenis gemonensis*, Laur., var. *asianus*.

Entirely black.

40. *Zamenis algirus*, Jan.

Algiers.

41. *Zamenis hippocrepis*, L.

Algiers.

42. *Drymobius bifossatus*, Raddi.

Loreal longer than deep. Frontal shorter than the parietals. Total length 1720 mm. ; tail 500.

43. *Drymobius Boddaertii*, Sentz.

44. *Coluber fasciatus*, sp. n. (Pl. XI. fig. 2.)

Rostral broader than deep. Internasals much shorter than the præfrontals. Præfrontals large. Frontal once and two thirds as long as broad, much longer than its distance from the end of the snout. Nasal entire. Loreal a little longer than deep. One præocular. Two postoculars. Temporals 2+2. Eight upper labials, third, fourth, and fifth entering the eye. Five lower labials in contact with the anterior chin-shields. Posterior chin-shields in contact anteriorly.

Scales smooth, in 17 rows, with two apical pits. Ventrals without or with a rather indistinct lateral keel, 179. Anal divided. Subcaudals 100, in two rows. Dark brown above, with narrow indistinct white (in spirit) cross-bands, extending on the ventrals. These bands are caused by large white edges to the scales. Lighter beneath. Head with white streaks and spots.

Total length 305 mm.; tail 30.

Ecuador.

A single specimen, belonging to the Museum of Lund, collected by Eggers in Balao (Ecuador), 1892.

45. *Coluber letus*, B. & G.

North America.

46. *Coluber obsoletus*, Say.

Scales rather feebly keeled.

North America.

47. *Coluber oxycephalus*, Boie.

Java.

48. *Coluber melanurus*, Schleg.

Java.

49. *Herpetodryas carinatus*, L.

50. *Dendrophis pictus*, Boie.

Java.

51. *Dendrophis formosus*, Boie.

Java.

52. *Dendrelaphis subocularis*, Blgr.

Java.

A single specimen, ventrals 160.

53. *Dendrelaphis caudolineatus*, Gray.

Java.

Five specimens, collected by Dr. Hj. Möller, 1897. *The genus Dendrelaphis had not previously been found in Java.*

54. *Gastropyxis smaragdina*, Schleg.

55. *Leptophis occidentalis*, Gthr.

56. *Dromicus antillensis*, Schleg.

West Indies.

57. *Dromicus rufiventris*, D. & B.

West Indies.

58. *Liophis albiventris*, Jan, type A.

Ecuador.

59. *Liophis pæcilogyrus*, Wied.

Argentine.

60. *Liophis typhlus*, L.

Brazil.

61. *Liophis epinephelus*, Cope.

62. *Liophis reginae*, L.

Brazil.

63. *Liophis parvifrons*, Cope.

64. *Xenodon Merremi*, Wagl.

Brazil.

65. *Heterodon platyrhinus*, Latr.

Two specimens have scales very feebly keeled, but do not differ in other structural characters.

United States of America.

66. *Aporophis lineatus*, L.

67. *Rhadinea anomala*, Gthr.

Argentine.

68. *Rhadinea cobella*, L.

69. *Rhadinea fusca*, Cope.

70. *Urotheca lateristriga*, Berth.

Ecuador.

71. *Dimades plicatilis*, L.

72. *Coronella austriaca*, Laur.

Europe.

73. *Coronella triangulum*, Daud., type A.

North America.

74. *Cemophora coccinea*, Blumenb.

The supraoculars fused with the frontal.

75. *Simotes octolineatus*, Schn.

Java.

76. *Contia vernalis*, Harl.

Total length 580 mm.

North America.

77. *Homalosoma lutrix*, L.

78. *Petalognathus nebulatus*, L.

Brazil.

79. *Carphophis amœnus*, Say.

North America.

80. *Calamaria Linnæi*, Boie.

Java.

Series OPISTHOGLYPHA.

81. *Hypsirhina enhydris*, Schn., type A.

East Indies.

82. *Homalopsis buccata*, L.

Java (one specimen with a length of 840 mm. from the snout to the anal; tail stumped); East Indies.

83. *Cerberus rhynchops*, Schn.

84. *Gerardia Prevostiana*, Eyd. & Gerv.

85. *Eteirodipsas colubrina*, Schleg.

Internasals shorter than the præfrontals. Three præoculars, upper largest and reaching the frontal. Three suboculars; three postoculars. Temporals 2+2. Eight upper labials. Scales in 27 rows. Ventrals 213. Anal divided. Subcaudals 80, the anterior single. Brown above, yellow beneath; with irregular black or dark brown spots; the posterior ventrals with dark brown or black dots.

Total length 710 mm.; tail 130.

Madagascar.

A single specimen belonging to the Museum of Lund.

86. *Trimorphodon biscutatus*, D. & B.

87. *Lycognathus cervinus*, Laur.

88. *Dipsadomorphus multimaculatus*, Boie.

Java.

89. *Leptodira personata*, Cope.  
 90. *Leptodira albofusca*, Lacép.  
 91. *Leptodira annulata*, L.  
 92. *Oxyrhopus petolaris*, L.  
 93. *Oxyrhopus trigeminus*, D. & B.  
 94. *Oxyrhopus clælia*, Daud.  
 95. *Thamnodynastes Nattereri*, Mik.  
 Subcaudals 80.  
 Brazil.  
 96. *Thamnodynastes punctatissimus*, Wagl.  
 97. *Tomodon ocellatus*, D. & B.  
 98. *Philodryas æstivus*, Schleg.  
 Total length 1300 mm.  
 99. *Philodryas viridissimus*, L.  
 100. *Philodryas Olfersii*, Licht.  
 101. *Philodryas Schotti*, Schleg.  
 102. *Trimerorhinus rhombeatus*, L.  
 103. *Cælopeltis monspessulana*, Herm.  
 Algiers.

ANISODON, gen. nov.

Hypapophyses throughout the vertebral column, represented on the posterior dorsal vertebræ by a well-developed crest, projecting below the condyle. Solid maxillary teeth anteriorly small, increasing in size and followed by an interspace, after which the teeth are very small; the last two large and grooved, situated below the posterior border of the eye. Mandibular teeth unequal, the anterior largest and separated from the rest by a short interspace. Head distinct from neck. Snout pointed. Eye rather large. Body cylindrical. Tail moderate. Scales smooth, in 17 rows. Subcaudals in 2 rows.

Java.

104. *Anisodon Lilljeborgi*, sp. n.\* (Pl. XI. fig. 3.)

Rostral much broader than deep. Internasals as long as broad, shorter than the præfrontals. Nasal entire. Loreal

\* I take the liberty of naming this snake after the celebrated Swedish zoologist Prof. W. Lilljeborg, who has determined the old collections of snakes in the Museum of Lund.

irregular. Frontal nearly twice as long as broad, longer than its distance from the rostral, nearly as long as the parietals. One præocular. Two postoculars. Supraocular large. Temporals 2 + 2. Eight upper labials; second and third reaching the præocular; third, fourth, and fifth entering the eye. Three lower labials in contact with the anterior chin-shields.

Fig. 2.



*Anisodon Lilljeborgi*, gen. et sp. n.

- a. Maxillary and anterior part of the mandible.  
b. Hypapophysis in the posterior region.

Scales smooth, in 17 rows. Ventrals 156–159. Anal entire. Subcaudals 43–50, in two rows. Greyish brown; a dorsal series of lighter spots, edged with black, indistinct posteriorly. Yellowish beneath, with irregular dark spots. Head with lighter and darker irregular streaks and dots. Along the upper labials a white streak, edged with black.

Total length 490 mm.; tail 95.

Java.

Two specimens, belonging to the Museum of Lund, collected by Dr. Hj. Möller in Tjibodas (Java), 1897.

105. *Macroprotodon cucullatus*, Geoffr.

Algiers.

106. *Dryophis xanthozona*, Boie.

Java.

In the 'Catalogue of Snakes,' vol. iii. (1896), Boulenger says:—"Anal entire (rarely divided)." Of the ten specimens which are preserved in the collections no less than nine have the anal divided.

107. *Dryophis prasinus*, Boie.

Java.

108. *Oxybelis acuminatus*, Wied.

109. *Chrysopelea ornata*, Shaw, type A. (Pl. XI. fig. 1; and text-fig. 1, d, p. 171.)

*Hypapophyses present throughout the vertebral column,*



represented on the posterior dorsal vertebrae by a well-developed crest, projecting below the condyle. Ventrals 222. Subcaudals 131.

Sumatra.

A single specimen, belonging to the Museum of Malmö, collected by C. Richter, 1895.

110. *Chrysopelea ornata*, Shaw, type D.

111. *Erythrolamprus Æsculapii*, L.

South America.

112. *Homalocranium melanocephalum*, L.

Ecuador.

#### Series PROTEROGLYPHA.

113. *Hydrus platurus*, L.

Coast of Java.

The two specimens belonging to the Museum of Lund have respectively 51 and 59 scales round the body. In the 'Cat. of Snakes' Boulenger states the scale-rows of this snake to be 45 to 47. The two specimens also differ from the description in 'Cat. Snakes' by having the frontal shorter than the parietals. In coloration they agree with the type E.

114. *Hydrophis gracilis*, Shaw.

115. *Enhydris Hardwickii*, Gray. (Pl. XII. fig. 1.)

One specimen, with six very feebly grooved small maxillary teeth.

116. *Distira longissima*, sp. n.

Head moderate. Body much elongated. Rostral about as broad as deep. Nasals shorter than the frontal, more than twice as long as the suture between the præfrontals. Frontal a little more than twice as long as broad, as long as its distance from the end of the snout, shorter than the parietals. One præocular. Two postoculars. Two anterior temporals. Eight upper labials; third, fourth, and fifth entering the eye, second largest and reaching the præfrontal. Two pairs of chin-shields; posterior a little longer than the anterior, in contact anteriorly. Scales smooth, imbricate, 31 round the neck, 35 round the middle of the body. Ventrals 320, smooth. Greyish green, with dark cross-bands, broadest on the middle, narrowing on the sides.

Total length 1650 mm.; tail 120.

Habitat unknown. A single specimen belonging to the Museum of Lund.

117. *Aipysurus australis*, Sauw.

Australia.

Ventrals 167-168.

118. *Platurus colubrinus*, Schn.119. *Denisonia superba*, Gthr.

Australia.

One specimen differs from the description of the genus *Denisonia* in having the poison-fangs followed by 7 small solid teeth. Boulenger states (Cat. Snakes) the number to be 3 to 5.

120. *Denisonia Gouldi*, Gray.

West Australia.

121. *Denisonia fasciata*, sp. n.

Eye moderate. Rostral broader than deep, visible from above. Internasals shorter than the præfrontals, broader than long. Frontal once and one fourth to once and one third as long as broad, shorter than its distance from the rostral, shorter than the parietals, much broader than the supraoculars. Nasal entire, narrowly in contact with the præocular. Two postoculars, upper in contact with the parietal. Six upper labials, second and third in contact with the præocular, third and fourth entering the eye. Temporals 2+1 or 2, lower anterior wedged in between the fifth and sixth upper labials. Three lower labials in contact with the anterior chin-shields. The posterior chin-shields separated by scales, about as long as the anterior. Scales in 17 rows. Ventrals 153-165. Anal entire. Subcaudals 28-31. Yellow (? in spirit), with large indistinct brown spots or cross-bands.

Total length 410 mm. ; tail 47.

West Australia.

Two specimens, belonging to the Museum of Lund, collected by Dr. N. Holst, 1897.

Seems to be closely allied to *D. maculata*, Sldr.

122. *Rhynchelaps Bertholdi*, Jan.

West Australia.

123. *Rhynchelaps fasciolatus*, Gthr.

West Australia.

124. *Bungarus fasciatus*, Schn.

Java.

125. *Bungarus candidus*, L.

Java.

Of the eight specimens in the collections there are seven with dark annuli on the tail (not cross-bands). Frontal shorter than its distance from the rostral. The coloration on the head a little variable.

126. *Naia melanoleuca*, Hallow., type A.

Gaboon.

Some scales with white dots and edges.

127. *Naia tripudians*, Merr., var. *leucodira*.

Java.

One black specimen.

128. *Doliophis bivirgatus*, Boie, type C.

Java.

129. *Doliophis intestinalis*, Laur., f. *typica*.

Java.

130. *Elaps fulvius*, L., type A.

North America.

131. *Elaps Spixii*, Wagl.

Brazil.

132. *Elaps frontalis*, D. & B.

Argentine.

133. *Elaps lemniscatus*, L.

## Fam. Amblycephalidæ.

134. *Dipsas infrenalis*, sp. n.

Maxillary with 12 teeth. Rostral as deep as broad. Internasals broader than long. Präfrontals much longer than the internasals, entering the eye. Nasal entire. One præocular. Two postoculars. No loreal. Frontal small, broad anteriorly, much shorter than the parietals. Temporals 1+2, very small. Nine upper labials, third, fourth, and fifth entering the eye. First lower labial in contact with its fellow behind the symphysial. Two pairs of chin-shields, the posterior largest. Five lower labials in contact with the anterior chin-shields. Scales smooth, in 15 rows, vertebral row enlarged. Ventrals 193. Anal entire. Subcaudals 99,

in two rows. Colour? (in spirit), with dark cross-bands, extending on the ventrals.

Total length 390 mm.; tail 100.

A single specimen, belonging to the Museum of Lund. Habitat unknown.

Fam. Viperidæ.

135. *Vipera berus*, L.

Europe.

136. *Cerastes cornutus*, Forsk.

Algiers.

137. *Ancistrodon rhodostoma*, Boie.

Java.

138. *Lachesis lanceolatus*, Lacép.

West Indies.

One specimen with small shields on the anterior part of the head.

139. *Lachesis atrov.*, L.

Maroni.

140. *Lachesis alternatus*, D. & B.

One specimen with a  $\times$ -shaped light marking.

141. *Crotalus terrificus*, Laur.

Well-developed shields between the internasals and the præfrontals.

142. *Crotalus horridus*, L.

EXPLANATION OF THE PLATES.

PLATE XI.

Fig. 1. *Chrysopelea ornata*, Shaw, type A.

Fig. 2. *Coluber fasciatus*, sp. n.

Fig. 3. *Anisodon Lilljeborgi*, gen. et sp. n.

PLATE XII.

Fig. 1. *Enhydris Hardwickii*, Gray.

Fig. 2. *Tretanorhinus intermedius*, sp. n.

XIII.—A Synopsis of the Species of the Silurid Genera  
*Parexostoma*, *Chimarrichthys* and *Exostoma*. By C. TATE  
 REGAN, B.A.

THE fishes which have usually been placed in the genus  
*Exostoma* of Blyth fall into three very distinct groups, which  
 should be regarded as genera, as will be apparent from the  
 following synopsis:—

- I. Teeth all pointed, those of the upper jaw forming a band, which is produced backwards at the sides; gill-openings extending on to the lower surface of the body; fold of the lower lip broadly interrupted; pectoral with 11 branched rays . . . . . [gen. nov.  
 PAREXOSTOMA,
- Pectoral extending  $\frac{2}{3}$ – $\frac{3}{4}$  of the distance from its base to the base of ventral; caudal peduncle 3 times as long as deep . . . . . 1. *P. Stoliczka*, Day.
- Pectoral extending  $\frac{1}{2}$ – $\frac{2}{3}$  of the distance from its base to the base of ventral; caudal peduncle twice as long as deep . . . . . [Regan.  
 2. *P. maculatum*,
- II. Teeth all pointed, those of the upper jaw forming a band which is not produced backwards at the sides; gill-openings not extending on to the lower surface of the body; fold of the lower lip continuous or not; pectoral with 13–19 branched rays . . . . . [Sauv.  
 CHIMARRICHTHYS,
- A. Lower angle of gill-opening below the middle of the base of pectoral, which fin extends about to the base of ventral; fold of the lower lip not continuous.
- Pectoral with 13 or 14 branched rays; caudal peduncle much longer than deep . . . . . 1. *C. Davidi*, Sauv.
- Pectoral with 16 or 17 branched rays; caudal peduncle about as long as deep . . . . . 2. *C. Blythii*, Day.
- B. Lower angle of gill-opening opposite the middle of the base of pectoral.
- Pectoral with 14 or 15 branched rays, not reaching the ventral; fold of the lower lip not continuous . . . . . 3. *C. Fee*, Vincig.
- Pectoral with 19 branched rays, extending beyond the base of the ventral; fold of the lower lip continuous . . . . . [Vincig.  
 4. *C. macropterus*,
- III. Each jaw with 2 bands or patches of small pointed teeth, with an enlarged outer series of compressed obtuse teeth; gill-openings not extending on to the lower surface of the body; fold of the lower lip continuous; pectoral with 10–12 branched rays . . . . . EXOSTOMA, Blyth.

A. Caudal fin truncate or very slightly emarginate.

- Origin of dorsal posterior to the extremity of pectoral; anal with I 5 rays ..... [Regan.  
1. *E. Vinciguerra*,  
Origin of dorsal above posterior  $\frac{1}{3}$  of pectoral; [Day.  
anal with I 7 rays ..... 2. *E. Andersoni*,

B. Caudal fin forked or rather deeply emarginate. [Blyth.

- Pectoral with 10 branched rays ..... 3. *E. Berdmorii*,  
Pectoral with 12 branched rays ..... 4. *E. labiatum*,  
[MacClell.

## PAREXOSTOMA.

### 1. *Parexostoma Stoliczkae*.

*Exostoma Stoliczkae*, Day, Proc. Zool. Soc. 1876, p. 782; Second Yarkand Mission, Ichthyology, p. 1, pl. i. fig. 1 (1878); Fishes of India, p. 502, pl. cxvii. fig. 3 (1878).

*Exostoma Oschanini*, Herzenstein, Bull. Ac. St. Petersburg, xxxiii. 1890, p. 120.

*Hab.* Eastern Turkestan.

### 2. *Parexostoma maculatum*, sp. n.

Depth of body about 6 in the length, length of head nearly 4. Head as broad as long. Eyes small. Snout as long as postorbital part of head and  $1\frac{1}{2}$  the interocular width. Nasal barbel extending to eye, maxillary barbel to base of pectoral, outer mandibular barbel to gill-opening. Dorsal I 6, commencing slightly in advance of the extremity of pectoral; adipose fin as long as or longer than its distance from the dorsal. Anal I 5. Pectoral with 11 branched rays, extending  $\frac{1}{2}$ — $\frac{3}{5}$  of the distance from its base to the base of ventral. Ventral with 5 branched rays. Caudal truncate. Caudal peduncle twice as long as deep. Olivaceous, with numerous irregular dark spots; caudal with a white posterior margin.

Two specimens, 210 and 255 mm. in total length, from Lhasa, Tibet, collected by Capt. H. J. Walton.

## CHIMARRICHTHYS.

*Chimarrichthys*, Sauvage, Rev. et Mag. Zool. xxv. 1874, p. 332.

### 1. *Chimarrichthys Davidi*.

*Chimarrichthys Davidi*, Sauvage, Rev. et Mag. Zool. xxv. 1874, p. 333.

*Exostoma Davidi*, Günth, in Pratt, Snows of Tibet, Appendix, p. 245 (1892).

*Hab.* Eastern Tibet.

2. *Chimarrichthys Blythii*.

*Exostoma Blythii*, Day, Proc. Zool. Soc. 1869, p. 525; Fishes of India, p. 501, pl. cxvii. fig. 2 (1878).

*Hab.* Northern Bengal.

3. *Chimarrichthys Fecæ*.

*Exostoma Fecæ*, Vincig. Ann. Mus. Genov. xxix. 1890, p. 256, pl. viii. fig. 6.

*Hab.* Karenni Hills, Upper Burma.

4. *Chimarrichthys macropterus*.

*Exostoma macropteron*, Vincig. Ann. Mus. Genov. xxix. 1890, p. 253, pl. viii. fig. 5.

*Hab.* Khakhyen Hills, Upper Burma.

EXOSTOMA.

*Exostoma*, Blyth, Journ. As. Soc. Bengal, xxix. 1861, p. 155; Günth. Cat. Fish. v. p. 264 (1864).

1. *Exostoma Vinciguerræ*, sp. n.

*Exostoma labiatum* (non MacClell.), Vincig. Ann. Mus. Genov. xxix. 1890, p. 252.

Depth of body about  $7\frac{1}{2}$  in the length, length of head 5. Head as broad as long. Diameter of eye 2 in the interocular width, which is  $3\frac{1}{4}$  in the length of head. Snout twice as long as postorbital part of head. Nasal barbel extending to posterior margin of eye, maxillary barbel to anterior  $\frac{1}{3}$  of pectoral. Outer mandibular barbel not extending to base of pectoral; inner mandibular barbel very small. Fold of the lower lip continuous. Lower angle of gill-opening at the level of the base of the pectoral spine. Dorsal I 6, commencing behind the extremity of pectoral; adipose fin long and low, extending on to the caudal. Anal I 5. Pectoral with 10 branched rays, extending  $\frac{2}{5}$  of the distance from its base to base of ventral. Ventral with 5 branched rays, not reaching the vent. Caudal very slightly emarginate. Caudal peduncle twice as long as deep. Uniformly brownish; fins pale.

A single specimen, 80 mm. in total length, from the Khakhyen Hills, Upper Burma, collected by the late L. Fecæ.

2. *Exostoma Andersonii*.

*Exostoma Andersonii*, Day, Proc. Zool. Soc. 1869, p. 524.

*Hab.* Yunnan.

3. *Exostoma Berdmorii*.

*Exostoma Berdmorei*, Blyth, Journ. As. Soc. Bengal, xxix. 1861, p. 155; Günth. Cat. Fish. v. p. 265 (1864); Day, Proc. Zool. Soc. 1869, p. 526; Fishes of India, p. 502 (1878).

Hab. Tenasserim.

4. *Exostoma labiatum*.

*Glyptosternon labiatum*, MacClell. Journ. Nat. Hist. Calcutta, ii. 1842, p. 588.

*Exostoma labiatum*, Günth. Cat. Fish. v. p. 265 (1864); Day, Proc. Zool. Soc. 1869, p. 526; Fishes of India, p. 502 (1878).

Hab. Assam.

XIV.—*Descriptions of Five new Cyprinid Fishes from Lhasa, Tibet, collected by Captain H. J. Walton, I.M.S.* By C. TATE REGAN, B.A.

DURING the recent expedition to Tibet, Captain H. J. Walton made a small collection of fishes, which he has forwarded to the British Museum. Of seven species represented, six appear to be new to science, the exception being *Nemachilus Stolickzæ*, Day. This result is not surprising, for I believe that fishes have not before been described from this part of the Brahmaputra system. Five Cyprinid fishes are described below, whilst a new Silurid, *Parexostoma maculatum*, is described on p. 183.

1. *Schizopygopsis Younghusbandi*.

Pharyngeal teeth 4 : 3—3 : 4, cylindrical, obtusely pointed, those of the outer series slightly curved inwards. Depth of body  $4\frac{1}{3}$ — $5\frac{1}{4}$  in the length, length of head 4— $4\frac{1}{2}$ . Breadth of head  $1\frac{2}{3}$ — $1\frac{4}{5}$  in its length, diameter of eye 4—6, length of snout  $3\frac{1}{5}$ —4, interorbital width  $2\frac{2}{3}$ — $3\frac{1}{5}$ . Snout obtuse; anterior edge of upper jaw slightly below the level of the lower margin of the eye; maxillary extending to below anterior edge of eye; lower jaw shorter than the upper, with a nearly straight transverse anterior edge. Dorsal III 8—9, its origin a little nearer to tip of snout than to base of caudal; third simple ray slender, articulated, not serrated. Anal III 5—7. Pectoral extending  $\frac{1}{2}$ — $\frac{2}{3}$  of the distance from its base to the base of ventral. Origin of ventral below or a little behind the middle of dorsal. Caudal forked. Caudal peduncle  $2\frac{1}{3}$ — $2\frac{3}{4}$



as long as deep. Greyish above, silvery below; upper part of body with irregular dark spots.

Ten specimens, 110–250 mm. in total length.

### 2. *Schizothorax dipogon*.

Depth of body about  $5\frac{1}{2}$  in the length, length of head  $4\frac{1}{2}$ . Upper profile of head nearly horizontal to just in front of the nostrils, where it bends abruptly downwards and becomes nearly vertical. Breadth of head  $1\frac{3}{4}$  in its length. Snout obtuse, much shorter than postorbital part of head. Diameter of eye 6 in the length of head, interorbital width  $3\frac{1}{4}$ . Mouth subterminal; lower jaw apparently without horny covering; lips strongly developed, continuous, the upper with median prolongation, the lower notched medianly. No anterior barbel; posterior barbel  $1\frac{1}{3}$  the diameter of eye. Scales regularly arranged anteriorly above the lateral line, becoming smaller and irregular on the lower part of the side in the abdominal region; lower part of thorax and abdomen naked; about 90 scales in a longitudinal series. Dorsal III 8, the third simple ray slender, articulated, not serrated; origin of dorsal far in advance of the bases of the ventrals, nearer to tip of snout than to base of caudal. Anal III 6. Pectoral extending a little more than  $\frac{1}{2}$  the distance from its base to the base of ventral; ventral extending  $\frac{2}{3}$  of the distance from its base to the origin of anal. Caudal forked. Caudal peduncle  $2\frac{2}{3}$  as long as deep. Brownish above, lighter below; dark spots on the upper surface of the head and one on each scale of the upper part of the body.

A single specimen, 265 mm. in total length.

In the peculiar shape of the head, the structure of the lips, and in having the third simple ray of the dorsal slender and articulated this species resembles *S. Regelii*, Herz., but differs notably in the absence of the anterior barbels and in having the thorax and abdomen naked.

### 3. *Schizothorax Waltoni*.

Depth of body  $4\frac{1}{3}$  in the length, length of head 4. Upper profile of head descending slightly to above the nostrils and thence more strongly to the tip of snout. Breadth of head twice in its length. Snout pointed, a little shorter than postorbital part of head. Diameter of eye  $6\frac{1}{4}$  in the length of head, interorbital width  $3\frac{2}{3}$ . Mouth subterminal; lower jaw apparently without horny covering; upper lip slightly elevated medianly; lower lip with a small median lobe and a pair of well-developed lateral lobes; 2 barbels on each side,

subequal, nearly  $\frac{1}{4}$  the length of head. Scales regularly arranged, 124 in a longitudinal series; thorax and abdomen scaly. Dorsal III 8, the third simple ray a stout coarsely serrated spine,  $\frac{2}{3}$  the length of head; origin of dorsal behind the bases of the ventrals, nearer to base of caudal than to tip of snout. Anal II 5. Pectoral extending less than  $\frac{2}{3}$  the distance from its base to base of ventral; ventral extending nearly to the vent. Caudal forked. Caudal peduncle  $1\frac{1}{3}$  as long as deep. Olivaceous; fins pale.

A single specimen, 160 mm. in total length.

This species is allied to *S. progastus*, MacGlell.

#### 4. *Schizothorax macropogon*.

Depth of body about 4 in the length, length of head  $4\frac{1}{2}$ . Upper profile of head straight, oblique. Breadth of head  $1\frac{1}{3}$  in its length. Snout rounded, shorter than postorbital part of head. Diameter of eye  $5\frac{1}{3}$  in the length of head, interorbital width  $2\frac{2}{3}$ . Mouth inferior; lower jaw without horny covering; fold of the lower lip broadly interrupted; 2 barbels on each side, subequal,  $\frac{1}{2}$  as long as the head or more. Scales small and irregularly arranged on the anterior part of the body, about 160 in a longitudinal series; lower part of thorax and abdomen naked, except for some rudimentary imbedded scales. Dorsal III 8, the third simple ray a stout coarsely serrated spine, about  $\frac{3}{4}$  the length of head; origin of dorsal behind the bases of the ventrals, nearer to base of caudal than to tip of snout. Anal III 5. Pectoral extending  $\frac{3}{4}$  of the distance from its base to the base of ventral; ventrals extending nearly to the vent. Caudal forked. Caudal peduncle  $1\frac{3}{4}$  as long as deep. Dark greyish, with some darker spots on the upper part of the body; fins dusky.

A single specimen, 230 mm. in total length.

Distinguished from allied species by the long barbels.

#### 5. *Nemachilus tibetanus*.

Depth of body 5 in the length, length of head 4. Snout a little shorter than postorbital part of head,  $1\frac{1}{2}$  as long as eye, the diameter of which is 5 in the length of head and  $1\frac{1}{2}$  in the interorbital width. Breadth of head  $1\frac{5}{6}$  in its length and equal to its depth. Cleft of mouth extending to below the nostrils; lips moderately thick, plicated, the lower interrupted medianly; barbels six; outer rostral barbel reaching the base of the maxillary barbel, which is a little shorter than the eye. Scales entirely wanting. Dorsal II 8, its origin equidistant from anterior margin of eye and base of caudal.

Anal II 6. Pectoral extending  $\frac{3}{5}$  of the distance from its base to the base of ventrals. Ventrals 9-rayed, extending to the origin of anal. Caudal emarginate. Caudal peduncle slender,  $3\frac{1}{2}$  as long as deep, its length  $\frac{3}{4}$  the length of head. Greyish, with irregular dark spots on head, body, and fins.

A single specimen, 125 mm. in total length.

Allied to *N. ludacensis*, Günth.

XV.—Description of a new Batrachian of the Genus  
*Bombinator* from Yunnan. By G. A. BOULENGER, F.R.S.

[Plate XIII.]

ONLY three species of *Bombinator* were previously known—*B. igneus*, Laur., and *B. pachypus*, Bp., from Europe, and *B. orientalis*, Blgr., from Manchuria, Corea, and Northern China. To my great surprise and gratification a small series of Batrachians collected by Mr. John Graham near Tong Chuan Fu in Yunnan (altitude about 6000 feet), which has just reached the British Museum, contained three examples of a fourth species, remarkable for its large size and as greatly extending the known range of this genus and also of the small family, Discoglossidæ, to which it belongs. For this new species I propose the name

*Bombinator maximus*. (Pl. XIII.)

Vomerine teeth in two small groups or short transverse series close together behind the level of the choanæ. Tongue large, circular, scarcely free at the sides and behind. Head broader than long; snout rounded, not quite as long as the diameter of the orbit; no canthus rostralis; nostril equally distant from the eye and the tip of the snout; interorbital space narrower than the upper eyelid, nearly equal to the distance between the nostrils. Fingers short, obtusely pointed, first shortest, third longest, fourth a little longer than second; no subarticular tubercles; two round palmar tubercles, inner larger and more prominent. Tibio-tarsal articulation reaching the shoulder, tarso-metatarsal articulation reaching the eye; tibia as long as the femur, the heels meeting when the legs are folded at right angles to the rhachis; foot as long as the tibia; toes short, obtuse, flattened, only half-webbed; no subarticular tubercles; a small, rounded inner metatarsal tubercle. Upper parts covered with small warts intermixed with very large glands studded with pores, similar to the parotoids of toads; the largest are situated behind the eyes (true parotoids), on the tibia, on the tarsus, and on the back, where they form a pair of curved or angular chains behind the head, with

the convexity turned inwards. Lower parts nearly smooth; a more or less distinct gular fold. No horny spines on any part of the body. Blackish olive above, with rather ill-defined black markings forming vertical bars on the upper lip and cross-bars on the limbs; only the inner finger and toe with a light tip; a more or less distinct light transverse spot on the back, just behind the head. Lower parts marbled bright



Female, smaller specimen, upper view of head and anterior part of body, natural size.

orange and black, in about equal proportions, or the black predominating; greater part of palm and sole orange, this colour involving the inner digit; the orange of the lower surface of the arm either extending across the breast, or widely separated from a pair of pectoral spots; plantar, tarsal, and tibial orange spots continuous or interrupted; the orange not extending on the back of the thighs.

	mm.
From snout to vent.....	68
Length of head.....	19
Width of head.....	23
Diameter of eye.....	6
Interorbital width.....	3
Fore limb.....	32
Hind limb.....	73
Tibia.....	24
Foot.....	24

The three specimens here described are females.

EXPLANATION OF PLATE XIII.

- Fig. 1.* Female, largest specimen, upper view, natural size.
- Fig. 2.* Female, lower view, natural size.

XVI.—*Description of a new Snake of the Genus Atractaspis from Mount Kenya, British East Africa.* By G. A. BOULENGER, F.R.S.

A SMALL collection of reptiles made by Mr. S. L. Hinde at Fort Hall, Mount Kenya, 4400 feet, contains, in addition to specimens of four species previously described by me from East Africa—viz. *Lygosoma clathrotis*, *Chamaleon Jacksoni*, *Chamaleon Roperi*, and *Glauconia Emini*,—an example of the Viperid genus *Atractaspis*, unique in having two postoculars instead of one. It represents a new species, which I propose to name

*Atractaspis bipostocularis.*

Snout very short, rounded. Portion of rostral visible from above half as long as its distance from the frontal; suture between the internasals as long as that between the præfrontals; frontal a little longer than broad, nearly twice as long as its distance from the end of the snout, as long as the parietals; one præ- and two postoculars; a very large temporal wedged in between the fourth and fifth upper labials and in contact with the lower postocular; five upper labials, third and fourth entering the eye, fourth largest; first lower labial in contact with its fellow behind the symphysial; four or five lower labials in contact with the chin-shields, fourth or fifth very large. Scales in 23 rows. Ventrals 233; anal divided; subcaudals 24 pairs. Dark olive above and beneath, upper surface of head paler.

Total length 240 mm.; tail 16.

A single young specimen.

XVII.—*List of a Collection of Neuroptera Odonata (Dragon-flies) formed by G. A. K. Marshall, Esq., at Salisbury, Mashonaland, with Descriptions of a new Genus and Two new Species.* By W. F. KIRBY, F.L.S., F.E.S.

THIS small collection was recently presented to the Natural History Museum by Mr. Guy Marshall, and is interesting on account of all the specimens being marked with the month of capture. A few notes are also added, chiefly on the colours of the living insects.

## Libellulidæ.—LIBELLULINÆ.

- Pantala flavescens*, Fabr. : (no. 29) Nov. 1903.—Four specimens.
- Trithemis arteriosa*, Burm. : (no. 42) October 1903, April 1904.—Seven specimens.
- Trithemis stictica*, Burm. : (no. 53) April 1904.—One specimen.
- Crocothemis erythræa*, Brullé : (no. 25) Oct. 1903, April 1904.—Five specimens.
- Orthetrum chrysostigma*, Burm. : (no. 14) April 1904.—Three specimens.
- Misthotus Marshalli*, sp. n. (*vide infra*) : (nos. 6 & 26, immature) Oct. 1903, (no. 5, adult) Nov. and Dec. 1903.—Five specimens.
- Diplacodes exul*, Selys : (nos. 3 & 26) Oct. 1903, (no. 40) Nov. 1903, (no. 11) March 1904.—Four specimens.

## Æschnidæ.—ÆSCHNINÆ.

- Hemianax ephippiger*, Burm. : (no. 30) Nov. 1903.—Two specimens.

## Agrionidæ.—CÆNAGRIONINÆ.

- Disparoneura glauca*, Burm. : (no. 23) November 1903.—One specimen.
- Micronympha senegalensis*, Ramb. : (nos. 46 & 48) Oct. and Nov. 1903, (no. 46, November). “Sides of thorax and of two basal and two apical segments of abdomen bright blue.” (*G. M.*)—Several specimens.
- Pseudagrion punctum*, Ramb. : (no. 41) Oct. and Nov. 1903, “Apex of abdomen pale blue.” (*G. M.*); (no. 45) Nov. 1903, “♀ of 24.” (*G. M.*)—Nine specimens.
- Pseudagrion Deckeni*, Gerst. (according to the above note = *P. punctum*, ♂) : (nos. 24, 41, 43, 44) Oct. and Nov. 1903, (nos. 44 & 46) April 1904.—Fourteen specimens.
- Agriocnemis exilis*, Selys : (no. 16) Oct. 1903.—One specimen.
- Lestes obscurus*, Kirb. : (no. 15) Oct. 1903, March and April 1904.—Four specimens.

Genus *MISTHOTUS*, nov.

Eyes contiguous, scarcely expanded behind, frontal tubercle rounded; abdomen about as long as the fore wings, rather slender, neither thickened nor constricted at the base, with the second and third segments carinated; terminal appendages of male rather short and slender, thickened towards the extremity, scarcely longer than the broad triangular lower appendage: fore wings with 11 or 12 continuous antenodal cross-nervures and 9 to 11 postnodal cross-nervures in the upper space and 7 or 8 in the lower (only 5 in female); pterostigma rather long, with 2 or 3 nervures in the space below it; only 1 nervure in the lower basal cell; no supra-triangular nervures; triangle regular, traversed, followed by 3 rows of post-triangular cells, only increasing towards the extremity, subtriangular space consisting of 3 cells; sectors of the arenulus stalked, only slightly waved, lower sector of the triangle rising just beneath the triangle: hind wings with 9 or 10 continuous antenodal cross-nervures (sometimes an accessory one in the upper series), and 11 postnodal upper cross-nervures and 8 lower; triangle untraversed, followed by two rows of cells increasing above the upper sector, which rises close to the lower one.

Differs from *Orthetrum* chiefly by the uninflated and unconstricted abdomen. Several species described under *Orthetrum* (among others *O. flavidulum*, Kirb.) will probably fall into this genus.

*Misthotus Marshalli*, sp. n.

Exp. al. 58 mm.; long. pter. 3 mm.; long. corp. 34 mm.

*Male*.—Head black; vertex purple, coarsely punctured; below it a yellow spot on each side, touching the eye; mentum with the sides broadly yellow; outer orbits yellow, spotted with black; thorax and abdomen pruinose blue, with some slight yellow markings at the base of the legs, on the sides of the base of the abdomen beneath, and on the lower abdominal appendage above; thorax very hairy; legs black: wings very clear hyaline, with blackish neuration; stigma dark brown, slightly bordered with smoky yellow on the inner edge; base of wings with a smoky yellow patch, nearly obsolete on the fore wings; membranule of hind wings small, grey.

Salisbury, Nov. and Dec. 1903. Two specimens.

*Female* (taken *in cop.* with one of the two males described

above, in Nov. 1903) and *immature male* (Oct. 1903).—Head yellow, antennal tubercles surrounded with purple (vertex wholly purple in male); thorax yellow, a black isosceles triangle above, pointing backwards, and with 5 or 6 more or less confluent oblique stripes on the pleura; interalary space varied with black and yellow; abdomen yellow, with 3 black bands, widening behind, one median, the others lateral; the lateral ones more or less interrupted towards the base; fourth segment with a black transverse line near the base, simulating an imperfect carina (in the pruinose males first described this is hidden). All else as in the adult males previously described.

In a still more immature male, taken in October, which seems to belong to the same species, the neuration is reddish, with the yellow at the base of the wings more extended; the dark median triangle of the thorax and the median abdominal stripe are barely indicated, and the pleura and sides of abdomen at the base are almost white, with oblique black lines.

*Misthotus ambiguus*, sp. n.

Exp. al. 70 mm.; long. pter. 3 mm.; long. corp. 38 mm.

*Male*.—Vertex purple, with greenish shades in certain lights; face mostly greenish; rhinarium black, with an orange spot on each side; mentum black, with a broad orange band on each side; outer orbits yellow, spotted with black. Body and wings nearly as in the last species; fore wings with 11 continuous cross-nervures, and sometimes an accessory one on one side, not continued beneath, 10 in the upper postnodal space, and 7 in the lower: hind wings with 7 or 8 continuous antenodal cross-nervures, 10 or 11 in the upper postnodal space, and 7 or 8 in the lower.

Otherwise as in the last species.

*Hab.* Transvaal (*H. Ross*); Cape Colony.

A larger and stouter insect than *M. Marshalli*. Perhaps allied to *Orthetrum farinosum*, Förster, also from the Transvaal.

This is not one of Mr. Guy Marshall's captures, but I describe it here as an additional species of the new genus *Misthotus*.



XVIII.—*Notes on the Synonymy of Thecla spurina, Hew., and Thecla ericusa, Hew.* By HAMILTON H. DRUCE, F.Z.S., F.E.S.

MUCH confusion has been caused by Hewitson having described the male and female of both these species as distinct, which is the more remarkable as the female only differs on the underside by being paler in colour. Besides the specimens in the National Collection I have examined those in Mr. Godman's collection, amongst which are several co-types of Hewitson's which were formerly in Bates's possession and several of his types.

The first species described by Hewitson is *Thecla spurina*\*, the type of which (a female) is now in the British Museum; it is in indifferent condition and without locality. There are four females in Mr. Godman's collection (two Tapajos and two Pará) marked by Bates "*spurina*." These differ from the type only by being rather darker and by the orange spot between the tails on the upperside being less apparent, this, however, varying slightly in all four specimens. The specimen referred to by Hewitson as being in Bates's collection, and which is labelled "*spurina*, Hew., type," is, in fact, *T. ericusa*, Hew., of which an excellent figure is given (fig. 162).

We possess a single female from Bartica, British Guiana, obtained by Mr. H. S. Parish, which differs from the Amazon specimens only by being rather richer in colour, doubtless due to its being a fresher specimen, and by the total disappearance of the orange spot between the tails on the upper surface.

A few pages later is described *T. stagira* †, with two vars. (*a* and *b*).

Mr. Godman's collection contains one male from Bates's cabinet labelled "*stagira*" from Tapajos; also one female labelled "*stagira*" from Tapajos which I am quite convinced is *T. pion*, G. & S. ‡, judging from the colour and pattern of the underside, also by the costal margin of the fore wing being much more concave towards its middle than in *T. spurina* ♀.

\* *Thecla spurina*, Hew. Ill. Diurn. Lep. p. 102, t. xxxix. figs. 122, 123 (1867).

† *Thecla stagira*, Hew. Ill. Diurn. Lep. p. 113, t. xxxix. figs. 120, 121 (1867).

‡ *Thecla pion*, Godm. & Salv. Biol. Centr.-Am., Rhop. ii. p. 56, pl. liv. figs. 28-30.

The var. *a*, to which Hewitson originally gave the name *erenea*, and subsequently sunk under *stagira*, I do not know, and do not find it in the Hewitson Coll. or the B. M. Coll. According to the figure it has no brown apex and margin on fore wing above.

The var. *b*, mentioned by Hewitson as from Rio, I am also unable to find, but there is a male in Mr. Godman's collection of about the same size from Panama obtained by Mr. Champion.

Again, in the same work Hewitson describes and figures *T. volana*\* from the collection of the late W. W. Saunders.

In Mr. Godman's possession is a single female labelled "S," and on another ticket "Amazon." I have no doubt that this is Hewitson's type; it formerly belonged to Mr. Herbert Druce, who obtained it from the Saunders Collection at its dispersal. It cannot be separated from *T. spurina*. Messrs. Godman and Salvin, in Biol. Centr.-Americana, Rhop. ii. p. 52, refer to this species as *T. stagira*, probably because no Central-American females were sent to them.

Again, Hewitson describes the female as *Thecla timæa* † from Bates's collection, and the type is now in Mr. Godman's possession. It is slightly smaller than the type *T. volana*, but I can detect no other difference.

From a perusal of the foregoing remarks it will be seen that the synonymy of this species is as follows:—

<i>Thecla spurina</i> ,	Hew.	
„ <i>stagira</i> ,	„	
„ <i>volana</i> ,	„	
„ <i>timæa</i> ,	„	
„ <i>stagira</i> ,	„	Godm. & Salv.

*T. spurina*, like many other *Theclas* of which any considerable number of specimens can be got together, proves to have a rather wide range. I have examined specimens from Chiriqui and Panama in Central America, males only, and both sexes from British Guiana; from Manaure, N. Granada; from Tapajos and Pará, on the Amazon; from Paraguay (captured by Perrens) and from Brazil (Chapada), sent by Mr. H. H. Smith.

\* *Thecla volana*, Hew. Ill. Diurn. Lep. p. 123, t. xlviii. figs. 225, 226 (1869).

† *Thecla timæa*, Hew. Ill. Diurn. Lep. p. 125, t. li. figs. 268, 269 (1869) (*T. lydia*, Kirby, Cat. p. 393).

The next species here dealt with is *Thecla ericusa*\*, described by Hewitson from a female Brazilian specimen in the collection of the late W. W. Saunders. I have been unable to trace this type, but the figure is an excellent one, and there should be no difficulty in identifying it. Shortly afterwards Hewitson describes the male under the name *Thecla voconia*† from an unknown locality. This type is now in the British Museum, and without doubt = *T. ericusa*.

There are specimens from Venezuela (one female) and Rio (one male) in Mr. Godman's possession which were formerly in the Kaden Collection, and one female from Minas Geraes (Bates), also two males and two females from Chapida, Brazil, obtained by Mr. H. H. Smith, and two males from Paraguay (Perrens).

*T. ericusa*, which varies much in size, is at once distinguished in the male from *T. spurina* by possessing a simple brand on the fore wing place 1 just beyond the end of the cell, whilst that species has a double brand partly placed in the cell and partly beyond. The possession of this simple brand probably points to its near alliance with *Thecla brescia*‡, a well-known Central-American species.

XIX.—*On Two new Leucaniæ from British New Guinea.*

By GEORGE T. BETHUNE-BAKER, F.L.S., F.Z.S.

*Leucania leucosphenia*, sp. n.

♂. Head and collar ochreous brown, patagiæ and thorax reddish ochreous; abdomen pale ochreous brown, with a large pale yellowish anal tuft; legs pale ochreous brown, with dark reddish femora. Primaries pale ochreous brown, with all the veins palely outlined and a pale dash at the lower angle of the cell; cell filled in with pale reddish, with a like-coloured basal dash on its lower margin; a pale patch below the centre of the cell; a double postmedial row of dark dots; a greyish wedge-shaped mark on the termen below the apex; termen darkly dotted, inner margin pale,

\* *Thecla ericusa*, Hew. Ill. Diurn. Lep. p. 113, t. xlii. fig. 162 (1867).

† *Thecla voconia*, Hew. Ill. Diurn. Lep. p. 120, t. xlix. figs. 244, 245 (1869).

‡ *Thecla brescia*, Hew. Desc. Lyc. p. 13 (1868); Ill. Diurn. Lep. p. 119, t. l. figs. 260, 261 (1869).

with a dark dash above it near the base : secondaries pinkish brown, paler towards the base.

♀. Like the male in all respects.

Expanse, ♂ 44, ♀ 46 mm.

The types from Dinawa are in my collection ; the species flies in August.

*Leucania cryptargyria*, sp. n.

♂. Head pale rufous brown ; collar pale purplish brown, with four dark lines horizontally across ; patagiæ reddish brown, tinged with grey ; abdomen pale ochreous brown ; palpi pale purplish brown, pale ochreous internally ; legs pale ochreous brown, striped with reddish ; spines black at the base ; mid legs with tibiæ fringed with long pale hair ; an abdominal tuft of longish black hair at the base. Primaries pale ochreous brown, tinged with reddish in the cell and up to the apex, to which point the darker area tapers gradually ; costa broadly whitish grey ; a double postmedial row of black points ; termen slightly clouded ; the veins are more or less irrorated with black scales and the inner marginal area has a patch of similar-coloured scales : secondaries warm brown, slightly pinkish, with the costa and inner margin paler. Fringes pale pinkish, outer half white. Under surface : both wings uniform lustrous metallic silver, with a blackish spot on the costa a third from the apex.

Expanse 48 mm.

The type is in my collection from Dinawa.

XX.—On a new Vole from Kashmir.

By J. LEWIS BONHOTE, M.A.

THE collection of voles sent home from Kashmir by Col. A. E. Ward contains three specimens of a most interesting new species allied to *Microtus nivalis*, for which I propose the name

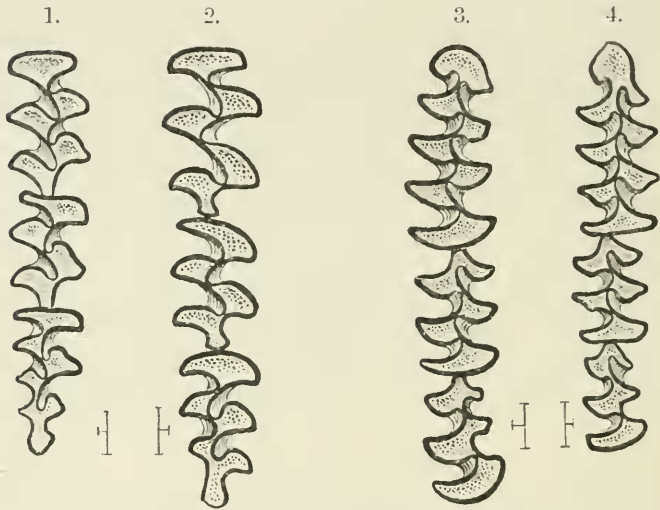
*Microtus imitator*, sp. n.

Differs externally from *M. nivalis* only in its smaller size and slightly browner coloration.

General colour above grizzled greyish brown, each hair being dark at its base, with a light subterminal portion and a

black tip; interspersed among these are longer pure black hairs. The colour is deepest across the back and paler on the flanks and cheeks. Underparts whitish, tinged with yellow; hairs with dark bases. Feet greyish. Tail long and bicolor, brown above, white below. Ears moderate, rounded, and clothed with short hairs similar in colour to the upper parts.

The skull is slightly smaller and flatter than in true *nivalis*, but the brain-case is rather more rounded at the sides. The auditory bullæ smaller, less elongate, and well rounded, thus slightly compressing the basioccipital.



1. Upper right (*imitator*). 2. Upper right (*nivalis*). 3. Lower right (*nivalis*). 4. Lower right (*imitator*).

Teeth generally resembling those of *M. nivalis*, with two important exceptions. In the species under consideration the spaces are rather narrower and smaller than in *nivalis*, the third molar of the upper jaw has four external angles instead of three, and the posterior lobe of the same tooth has a slight constriction on its inner edge, tending to form a fourth interior angle. In the lower jaw the anterior arrow-shaped head of the first molar is not symmetrical, but is elongated on its external side to form an oblong rounded space; a tendency towards this shape is found, so Dr. Forsyth Major tells me, in a specimen of *nivalis* from Mount Hermon, but

is never found among the western forms. The anterior external space of the third lower molar is similarly modified.

*Dimensions.* Head and body 105 mm.; tail 45; hind foot 15; ear 12.

*Skull.* Length of palate 12 mm.; length of nasals 8; length of molar series 6; width of brain-case above posterior roots of zygomata 13.

*Hab.* Tullian, Kashmir. Alt. 11,000 feet.

*Type.* B.M. 5. 1. 5. 12. ♂ ad. Tullian, Kashmir. Collected by Col. A. E. Ward, 14th July, 1903.

In outward appearance, as well as in skull-characters, this vole is undoubtedly allied to *M. nivalis* of Europe, which, however, has not hitherto been found east of the Caucasus; so that its discovery in Kashmir forms a considerable eastward extension of this group. Its smaller size, slightly browner coloration, and dental characters enable it to be distinguished easily from the typical *nivalis*.

## XXI.—A new *Ficalbia* from West Africa.

By F. V. THEOBALD, M.A.

### *Ficalbia nigripes*, sp. n.

Head black. Thorax pale bright yellowish brown, with two parallel dark lines behind. Abdomen deep brown, with narrow pale basal bands. Legs, antennæ, palpi, and proboscis deep blackish brown. Wings with pale scaled veins and with deep brown costa.

♂. Head clothed with flat deep black scales and black upright forked scales. Antennæ deep blackish brown, with paler dusky bands and deep brown plume-hairs. Proboscis deep blackish brown, swollen apically; palpi small, deep brown.

Thorax pale brown, clothed with long, narrow, curved, pale, dull yellowish scales, except for two parallel bare lines, and with two broad lines of long, narrow, curved, black scales on each side of the bare space in front of the scutellum and extending past it; two rows of long black bristles and numerous black ones over the roots of the wings; scutellum clothed with flat black scales and with brown border-bristles; metanotum deep brown; pleuræ pale ochreous.

Abdomen deep blackish brown, with white basal bands and brown lateral hairs.

Legs deep blackish brown ; the coxæ pale ochreous.

Wings with brown scales ; fork-cells short, of nearly equal length ; base of the first submarginal cell nearer the apex of the wing than that of the second posterior, its stem about one and a half times the length of the cell ; stem of the second posterior not quite one and a half times the length of the cell ; posterior cross-vein sloping backwards, not quite its own length distant from the mid vein ; median vein-scales in single line ; lateral vein-scales large and bluntly lanceolate, existing on the second, third, and branches of the fourth veins only, narrower ones on part of the first long vein, those on the first and subcostal short and spatulate, like those forming the median vein-scales, only in two rows ; costa with an inner row of short spatulate scales, and the outer border with deep brown spiny ones ; the sixth vein is much curved apically.

Length 2·8 mm.

*Time of appearance.* December.

*Hab.* Kortright, Freetown, Sierra Leone, 1200 feet (*Major F. Smith, D.S.O., R.A.M.C.*).

*Obs.* Described from a perfect male. The specimen was bred by Major Smith from a larva taken in a hole in a brook.

This is the first *Ficalbia* that has occurred in Africa. The only other species with banded abdomen is *F. minima*, Theob., from South India, but the Indian species has banded legs.

XXII. — *American Hymenoptera: new Bees and a new Proctotrypid.* By T. D. A. COCKERELL, University of Colorado.

*Prosopis crenulata*, sp. n.

♂.—Length about 5 mm.

Black ; head large, abdomen slender ; labrum, greater part of mandibles, scape in front, and face below middle lemon-yellow ; supraclypeal mark quadrate, a little higher than broad, slightly emarginate above ; lateral face-marks filling the space between the clypeus and supraclypeal mark and the eye, truncate and minutely crenulate above ; the yellow thus ends abruptly at about the same level right across the face, though its upper margin is not straight, but concave ; flagellum brown beneath ; front and vertex strongly punctured ; mesothorax well punctured ; metathorax polished and shining, with a very narrow basal sculptured area ; thorax

entirely black; tegulæ piceous; wings strongly dusky; femora black, except more or less at apex, tibiæ and tarsi yellow, the small joints of the tarsi infuscated; abdomen black, closely and distinctly punctured.

*Hab.* Mexico; further particulars unknown (Baker collection, no. 1785) \*.

The black scutellum distinguishes it from most of the Mexican species; I do not know of any close ally. In my table in 'Entomologist,' Aug. 1898, it runs to *P. rugosula*, Ckll., but it is quite distinct from that.

*Celioxys angelica*, sp. n.

♀.—Length about  $9\frac{1}{2}$  mm.

Entirely black, including the legs; pubescence white; tegulæ dark brown; wings with the apical half dusky; scutellum with the lateral teeth slender and somewhat hooked, no median tooth or tubercle; concavity of first abdominal segment bounded by a distinct rim, behind which is a narrow white hair-band; segments 1 to 5 with narrow apical hair-bands; transverse grooves on segments 2 and 3 broadly interrupted in the middle; apical dorsal segment rather broad, pointed (the point not at all upturned), not notched, but rather suddenly depressed about the middle, the depressed apical part with erect hairs; last ventral segment surpassing the dorsal, broad, with the margin ciliated with dark bristles, the apex not notched, but having a minute tooth-like prominence; penultimate ventral segment with strong punctures, and no little ones between.

*Hab.* Los Angeles, California (*Dr. A. Davidson*).

Allied to *C. modesta*, Smith, and *C. gilensis*, Ckll., but easily known from these by the last dorsal segment having no upturned point. From *C. apacheorum*, Ckll., it is known by its smaller size, apical ventral plate with a little projection, and penultimate ventral segment without little punctures interspersed among the large ones.

*Tripeolus wyomingensis*, sp. n.

♂.—Length just over 11 mm.

Black, including the antennæ, legs, and their spurs; pubescence greyish creamy, pure white on face; clypeus

\* Mr. E. S. G. Titus, who has access to Mr. Baker's note-book, informs me that no. 1785, the number attached to the type of *Prosopis crenulata*, signifies that it was collected by H. H. Hyde in the autumn of 1895, by "sweeping &c.," at Medellin, State of Vera Cruz, Mexico.



minutely rugose, with scattered large punctures; tegulae exceedingly dark brown: wings hyaline, with only a faint brownish tint; nervures dark reddish brown, paler basally; marginal and third submarginal cells each with a short appendicular nervure; third submarginal cell longer on marginal than on third discoidal; second submarginal cell considerably narrowed above, receiving the first recurrent nervure at its middle; basal nervure going a considerable distance basad of transverso-medial: mesothorax minutely roughened, with a broad but thinly hairy band across the anterior part, sending two tongues backwards; scutellum strongly bilobed, the lateral teeth short, black; pleura densely punctured, with a large circular bare patch: abdomen 6-banded, the first segment covered with hair, except the usual median patch, which is pointed but not greatly prolonged laterally; second segment with the lateral upward extensions of the band forming right angles, as in *T. nigriceps* (Smith); venter with pale hair-bands on the second and third segments and a coarse curled purplish-sooty fringe on the fourth.

*Hab.* Wyoming; no other particulars known. Received from Mr. John H. Lovell.

Superficially like *T. concolor* (Rob.), but the markings are not so yellow, and the patterns of the mesothorax and first abdominal segment are quite different; the face also is broader below, with the hair white (pale golden in *concolor*), and the sides of the vertex are densely punctured and dull, without any shining surface showing between the punctures, as it does in *concolor*. From *T. donatus* (Smith), which it rather approaches in the colour of its markings, it differs at once in the pattern of the thorax and abdomen. From *T. nigriceps* (Smith), which it approaches closely in pattern, it differs by its smaller size and wings not at all violaceous.

*Triepeolus callopus*, sp. n.

♀.—Length 10 mm. or slightly less.

Black, with the usual markings of pale ochraceous pubescence; legs bright ferruginous; basal three fifths of mandibles, labrum, and anterior margin of clypeus bright ferruginous; clypeus minutely roughened, with scarcely indicated scattered punctures; a prominent keel between the antennæ; scape dark; flagellum ferruginous, but much blackened, especially above, the first joint and base of second brighter; mesothorax nude, except for two stripes of pubescence on the anterior part and a patch at each posterior

lateral corner, its anterior margin quite bare, contrasting with the adjacent prothorax, which is very pubescent; scutellum with the anterior half bare and the posterior half pubescent, rather prominent, slightly bilobed, with the lateral teeth black, and very short; metathorax pubescent; pleura rather coarsely rugoso-punctate, pubescent, with a very large round bare area; tegulae apricot-colour, with hyaline margins; wings clear, second submarginal cell triangular; tibial spurs black: abdomen with entire bands on the hind margins of the first four segments; first segment with the basal half wholly covered with pubescence, and the black area a broad transverse band, rounded at the ends; second segment with the apical band sending from each side a broad process antero-mesad, forming an acute angle with the band; apex red, dorsally with a broad-oval flattened area; last ventral plate curved strongly downwards at the end; first three ventral segments with much pubescence, the last two bare, the penultimate one black margined with red.

*Hab.* Redondo, California (*Dr. A. Davidson*).

By the marking of the first abdominal segment this resembles *T. occidentalis* (Cresson); by the structure of the apex of the abdomen it resembles *T. penicilliferus* (Brues) and *T. concavus* (Cresson). It is a much smaller insect than either of the last-mentioned.

### *Synhalonia Gillettei*, sp. n.

♂.—Length about 16 mm.; antennae slightly over 11 mm.

Black, with rather dull white pubescence, faintly tinged with yellowish on the thorax; antennae entirely black, apical portion crenulated, third joint hardly over a quarter length of fourth, fourth longer than fifth; clypeus and labrum lemon-yellow, clypeus coarsely rugoso-punctate; mandibles black, with an obscure pale mark on basal portion; thorax densely hairy; tegulae ferruginous, with hyaline margins; wings slightly dusky, nervures dark ferruginous, basal nervure meeting transverso-medial; legs black, small joints of tarsi ferruginous, spurs pale reddish; hair of legs all pale, that on inner side of basal joints of tarsi ferruginous; abdomen hairy, segments 3 to 6 with white pruinose or velvety bands, such as usually seen in females of *Synhalonia*; venter with short scanty dark brown pubescence, except at sides, where it is white and conspicuous.

*Hab.* Fort Collins, Colorado, June 12, 1902 (Colorado Experiment Station).

Nearest to *S. frater* (Cresson), but considerably larger,

with the abdomen more hairy and distinctly banded. It has a strong superficial resemblance to *Melissodes machærantheræ*, Ckll., but the antennæ are much longer than in that species.

*Synhalonia fulvitaris* (Cresson).

Fort Collins, Colorado, May 27, 1900 (Colorado Experiment Station). Described from "Colorado," but this is the first indication of a precise locality or the time of flight.

Proctotrypidæ.

*Proctotrypes coloradicus*, sp. n.

♀.—Length 9 mm. or slightly over, with the cauda exceeding 10 mm.

Entirely bright ferruginous, only the eyes black, and the antennæ infuscated towards the end; head quadrate, but broader than long; first joint of flagellum longer than second; metathorax cancellate, with a fine median, longitudinal, raised line; second abdominal segment with only faint striæ at the extreme base; cauda somewhat less than half length of abdomen: upper wings dusky, marginal cell extremely minute, first (and only) submarginal cell extremely large; first discoidal open on outer side, the cubital nervure (which is very faint) not at all directed upwards, as it is in Ashmead's figure of *P. caudatus* (which also has the first discoidal closed); stigma not so near apex of wing as Ashmead figures for *caudatus*.

*Hab.* Boulder, Colorado, about 100 yards from no. 930 14th St., Oct. 1, 1904, running on the ground, looking like an ant (*Cockerell*).

Easily known by its large size, bright red colour, and the venation. It is most nearly allied to *P. pallidus*, Say.

Boulder, Colorado, U.S.A.,  
December 1904.

XXIII.—*Three undescribed Coleoptera from Natal.*

By W. L. DISTANT.

AMONG some insects recently sent to me by Mr. H. W. Bell-Marley from Natal were a certain number of the smaller Longicorn beetles, some of which were described species which cannot at present be included in my enumeration of

the Longicornia of the Transvaal, though they may probably occur in that country, while three appear to be new species, one necessitating the proposal of a new genus. For the systematic position of that genus I am again indebted to the advice of my friend Mr. C. J. Gahan.

## Order COLEOPTERA.

Fam. Cerambycidae.

Subfam. LAMINÆ.

Division ACMOCERIDARIA.

TAMBUSA, gen. nov.

Head considerably depressed between the antenniferous tubercles, which are prominent and inwardly and outwardly angulate; front oblique, with a small spinous callosity on each side near base; eyes coarsely faceted, the lower lobes large; antennæ a little longer than the body, thickly pilose, finely hirsute beneath; first joint somewhat transversely incrassate, its margins tuberculate, third and fourth longest and subequal in length, but third a little incrassate, fifth slightly longer than any of the remaining joints, which are subequal in length; pronotum about as long as broad, discally gibbous and laterally oblique, with a prominent spine near each posterior angle, two central, posterior, elevated, laminate processes, with their apices shortly tuberculously spinose, and with a short central spine between them; elytra a little narrowing posteriorly, their apices somewhat obliquely truncate, with a broad, cordate, raised, but inwardly concave process at base; acetabula of front coxæ angulate outwardly; intercoxal process of prosternum triangular; femora thickened, a little compressed at apex and much more so at base; tibiæ very slightly longer than the femora; first joint of tarsi considerably shorter than the second and third joints together.

This genus is allied to *Idactus*, Pasc.

*Tambusa Marleyi*, sp. n.

Fulvous brown, with some scattered fuscous mottlings; pronotum (excluding the discal processes) thickly, shortly, palely pilose, the surface very uneven, the outer margins and apices of the discal processes, the apex of the intermediate spine, and the apex of the posterior angles piceous; elytra tomentose, finely tuberculate, the tubercles (excluding those on basal process) arranged in longitudinal series, the basal

process dark fulvous, piceous towards apex, and its posterior margin very palely flavescent; there is a short, curved, inner apical fascia to each elytron, preceded by a transverse much waved line, and an irregular transverse discal spot before



*Tambusa Marleyi*, Dist.

middle (not reaching margins), pale ochraceous; antennæ with the bases of the fifth and succeeding joints greyish; legs (especially the tibiæ and tarsi) distinctly pilose, at base and apex of tibiæ greyish, femora and tibiæ with small scattered piceous spots.

*Var.*—Posterior margins of the lateral angles and the posterior margin to pronotum and humeral angles and basal process to elytra piceous.

Long. 13–15 mm.

*Hab.* Natal: Durban (*Bell-Marley*).

#### Division NIPHONIDARIA.

##### *Soridus griseus*, sp. n.

Griseous, punctured or minutely spotted with fuscous; head with the basal area from posterior margins of antenniferous tubercles fuscous, punctate, remaining portion and front griseous, the last with the apical area and a transverse fascia from between eyes fuscous; antennæ fuscous, shortly

griseously pilose; pronotum fuscously punctate, the disk confluent punctate, with a basal central griseous line; elytra finely pilose, longitudinally irregularly carinate, fuscously punctate, somewhat confluent so on lateral and



*Soridus griseus*, Dist.

basal areas, their apices subacuminate; sternum and legs fuscously punctate; abdomen beneath palely griseous, thickly tomentose, obscurely finely fuscously punctate.

Long.  $11\frac{1}{2}$  mm.

*Hab.* Natal: Durban (*Bell-Marley*).

This species only differs from Gahan's genus *Soridus* in having the apices of the elytra subacuminate, not "broadly subtruncate."

#### Division ACANTHOCINIDARIA.

##### *Exocentrus polymitus*, sp. n.

Pale griseous, much mottled or shaded with bright dark fuscous; head and pronotum sometimes almost entirely fuscous, with the posterior angles griseous, or the surface only fuscously punctate; elytra with two spots (the uppermost largest) on each side of suture before middle, followed by two very irregular and angularly waved transverse fasciæ, humeral angles and a marginal spot before middle dark bright fuscous brown; antennæ brownish ochraceous, first joint (excluding base), apices of joints 3-5, and nearly the whole

of the remaining joints fuscous brown; legs and body beneath fuscous brown; abdomen sometimes with a narrow, central, griseous fascia; pronotum with a strong posteriorly directed



*Exocentrus polymitus*, Dist.

lateral spine; elytra thickly and finely punctate; antennæ about twice the length of body.

Long. 4 mm.

*Hab.* Natal: Durban (*Bell-Marley*).

XXIV.—*A new Lizard and a new Frog from Borneo.*

By R. SHELFORD, M.A., F.L.S.

*Lygosoma (Keneuxia) Vyneri*, sp. n.

Habit lacertiform; the distance between the end of the snout and the fore limb is contained once and a third in the distance between axilla and groin. Snout moderate, obtusely pointed, somewhat depressed. Lower eyelid scaly. Nostril pierced in a single nasal; supranasals present, but not in contact with each other. Fronto-nasal as broad as long, in contact with the rostral but not with the frontal; the latter as long as the fronto-parietals and parietals together, in contact with the first and second supraoculars; five supraoculars, the fifth very small, the second the largest; eight supraciliaries, the first and second largest. Fronto-parietals

and interparietal distinct, the latter rather larger than the former and almost entirely separating the parietals; a pair of nuchals; four labials anterior to the subocular. Ear-opening small. 22 scales round the body; all the scales are smooth; the dorsals are larger than the ventrals. Præanals slightly enlarged. The adpressed limbs overlap. Digits slender, with sharp claws, the basal phalanges cyclotetragonal, the distal strongly compressed; subdigital lamellæ smooth, 20 under the fourth toe. Tail equal in length to head and body. Head greyish olive, some of the scales edged with black; a series of four dorsal scales are black, each scale with a central quadrate olive-grey spot, forming four longitudinal stripes; a dorso-lateral series of scales is olive-grey; sides of neck and body and the limbs covered with brown scales, black-edged; tail greyish olive; ventral surface pale green.

	mm.
Total length.....	132
Head.....	14
Width of head.....	10
Body.....	52
Fore limb.....	19
Hind limb.....	24
Tail.....	66

*Hab.* Mount Balineau, Muka district, Sarawak.

The type and only known specimen of this species, which has been named in honour of His Highness the Raja Muda of Sarawak, is deposited in the Sarawak Museum. Structurally this skink is very like the other species of the section *Keneuxia*, but it differs from *L. smaragdinum*, Less., by the absence of an enlarged scale on the heel, from *L. olivaceum*, Gray, and *L. vittatum*, Edel., by the smooth dorsal scales.

*Rana sariba*, sp. n.

Vomerine teeth in two oblique series commencing from the inner posterior angles of the choanæ. Head broad, snout rounded; interorbital space broader than the upper eyelid; tympanum distinct, about one half the size of the eye. Fingers moderate, the first not extending beyond the second, but shorter than it; the tips of the fingers expanded into small disks about two thirds the size of the tympanum; toes half-webbed, their tips expanded into disks which are a little larger than the disks of the fingers; subarticular tubercles well developed; inner metatarsal tubercle prominent, oval; no outer tubercle. The hind limb being carried forwards along the body, the tibio-tarsal articulation just falls short of



the tip of the snout. Skin of the throat and sides of the body with minute tubercles. Reddish brown above, closely marbled with darker brown, tibiae with three dark cross-bars; pale beneath.

From snout to vent 35 mm.

*Hab.* Mount Saribaw, Samarahan River, Sarawak.

This rather obscure little frog in general appearance resembles small specimens of *Rana Kuhlii*, D. & B., but the distinct tympanum and expanded tips of the digits readily serve to distinguish it from that species. The type and only known specimen (a female) is deposited in the Sarawak Museum.

XXV.—*The Heterogenetic Origin of Fungus-germs and Monads.* By H. CHARLTON BASTIAN, M.A., M.D., F.R.S., F.L.S.

[Plates XIV. & XV.]

SINCE my communication to 'Nature' on this subject, on Nov. 24 of last year, I have been devoting much of my leisure time to further observations on the development and transformations of small Zoogloea masses, with the result that I have abundantly confirmed the truth of my original observations, and have also been able to fill up several gaps in my previous knowledge. I have satisfied myself also that by far the best way for readily investigating these phenomena is to obtain very thin bacterial scums, by using filtered infusions not too strong, and a depth of fluid of rather less than one inch. As all the processes that I have been describing go on in the dark quite as well as in the light, the simplest plan is to filter the infusion, prepared as previously directed\*, into small one-ounce earthenware pots, over which the covers are then placed till the time comes for the examination of their contents. If three or four pots are prepared at the same time, they may be opened at will on successive days, or some may be exposed to one temperature and some to another.

It is important to bear in mind two fairly distinct aspects of my observations, corresponding with different stages in the processes described. We have to do (1) with the growth, the individualization, and the processes of segmentation taking place in masses of Zoogloea. We have also to do (2) with

\* 'Nature,' Nov. 24, 1904, p. 77.